The Application of Environmental Auditing Techniques to Cities and Regions

by Michael Frisch
B.A. Economics
Earlham College, 1983

Submitted to the Department of Urban Studies and Planning
in Partial Fulfillment of the requirements for the Degree of
Master of City Planning, Environmental Policy and Planning
at the Massachusetts Institute of Technology
June 1996

Signature of Author.....

Michael Frisch
Department of Urban Studies and Planning
May 23, 1996

Certified by.....

Lawrence Susskind
Ford Professor of Urban and Environmental Planning
Department of Urban Studies and Planning
Thesis Advisor

Accepted by.....

J. Mark Schuster
Associate Professor of Urban Studies and Planning
Chair, Masters in City Planning Program

THE APPLICATION OF ENVIRONMENTAL AUDITING TECHNIQUES TO CITIES AND REGIONS

by Michael Frisch

Submitted to the Department of Urban Studies and Planning on
May 23, 1996 in partial fulfillment of the requirements for the
Degree of Master of City Planning

ABSTRACT

Environmental auditing is an evaluation technique often used in the private sector to increase compliance with environmental laws, identify operational liabilities, reduce costs, and review environmental management systems. Cities and regions perform many environmental management functions. They might also benefit from environmental audits. This study examines how environmental auditing techniques developed in the private sector might be applied in the public sector.

The development of environmental auditing practice is reviewed via two case studies of auditing practice. International auditing standards are discussed. Environmental auditing is shown to be an emerging discipline. Through interviews with practitioners and a review of the literature, elements of successful auditing practice are identified.

Environmental auditing in the public sector is less developed than the practice in the private sector. Two case studies of public sector audits are reviewed against the elements of successful audits previously identified. This study finds that there are fewer motivations to audit in the public sector. Cost reduction is the primary motive for cities and towns. I make nine recommendations for environmental audit implementation in cities and regions.

Thesis Supervisor: Lawrence Susskind
Title: Ford Professor of Environmental and Urban Planning
Department of Urban Studies and Planning

Table of Contents

Acknowledgments

This study would not have been possible without the assistance of many people. I would like to thank all of the environmental auditing practitioners who answered my questions in my interviews. Maryanne DiBerto, Vice President and Managing Director of Environmental, Health, and Safety Consulting at Arthur D. Little was especially helpful.

Thanks also go to my committee, Professors Lawrence Susskind and Vicki Norberg-Bohm, who struggled with me to develop the direction of the study. I also need to thank Dr. Barry Commoner of the Center for the Biology of Natural Systems at Queens College in Flushing, NY. The inspiration for this study comes from work I performed with Dr. Commoner several years ago.

Several friends provided important moral assistance to me in this work. These include Ron Suresha, Christine Poff, and Tom Webster. Thank you for being there when I needed you.

Finally, thanks are due to my partner Steven Evans. His love and caring have sustained me throughout my two years at MIT

Chapter 1: Introduction to Environmental Auditing

Introduction

In 1992, New York City faced a deep financial crisis. Environmental programs were being cut, since they were seen as non-essential government activities. In response to these cuts many observers wondered if there were ways to save money and improve the environment. A review of the city's operations with an eye to environmental performance revealed several areas where better application of environmental practice might save the city money (Frisch and Commoner, 1994). The review was called an environmental audit. In hindsight, this review can be called environmental audit only in the loosest application of the term.

This study expands upon this earlier effort. In it, I examine the general practice of environmental auditing and in particular, how environmental auditing techniques developed in the private sector might be applied in the public sector. I hope this study builds the theoretical basis for more environmental auditing practice in the public sector. The widespread usage of the practice in the private sector clearly indicates its benefits. Many of the most important organizational functions in society are in the local public sector. If the use of private sector evaluation techniques will improve environmental compliance, save money and lead to better decision making, I believe that those techniques should be locally adopted.

In this chapter, I introduce the concept of environmental auditing and identify the benefits of performing environmental audits. Yet, these benefits are only accruing to the private sector. Cities and towns perform environmental management functions, but they do very little environmental auditing. This leads to the central question addressed by the thesis.

What Is Environmental Auditing?

An environmental audit is an evaluation with environmental objectives. As an evaluation, an audit has clear objectives and defined criteria. There are few formal audit procedures beyond what is necessary to produce evaluative information. Most people perceive auditing as a procedure that is more formal than it actually is in practice (Cairncross, 1992). Audits do not

have to be financial in nature. The criteria may or may not include cost. For an audit to be an "environmental audit" it must have environmental objectives or evaluate environmental systems.

Reactive Environmental Audits

Environmental auditing began as a voluntary compliance technique in the 1970's. Starting in the late 60's, the US Congress passed many new significant environmental laws including the Clean Air Act, the Clean Water Act, and the National Environmental Policy Act. Criminal enforcement of these laws began in the late 70's. Under the threat of enforcement, companies wanted to assess their degree of compliance. Auditing was a way to assess how the laws applied to a site, and the extent of any non-compliance problems. These environmental audits are known as compliance audits.

The passage of CERCLA (the Superfund legislation) led to another form of environmental auditing. Under CERCLA, regulators assign liability of hazardous waste sites. Companies began to perform environmental audits in order to assess their exposure to these liabilities. These audits became known as liability audits.

Both compliance audits and liability audits are reactive. Companies performing these audits are responding to policies external to their own organization. This response is typical of the "command and control" approach to environmental management. When a new regulation is passed, companies work to control emissions by adding pollution control devices rather than changing production processes. Such an approach increases costs per unit of output. In such a mode of operation, compliance or liability audits are used to identify where the control systems need to be installed.

Proactive Environmental Audits

In the 1980's and 1990's many companies initiated more proactive approaches to environmental management. These include the establishing of environmental management systems, adopting pollution prevention strategies, incorporating environmental accounting procedures and developing corporate sustainability goals. Companies use environmental audits to evaluate and to improve these proactive programs.

Often in response to an environmental disaster (e.g. the kepone spill in the case of Allied Chemical or the discharge of chemicals into the Charles River in the case of Polaroid) companies developed their own environmental policies and management infrastructure to implement these policies. These management systems are designed to prevent similar incidents from recurring and to document positive corporate environmental accomplishments. Environmental management system audits can be used to assess the effectiveness of these systems and to generate data that can then be used to improve the company's image. For example, ICI uses the results of these audits in corporate environmental reports (ICI, 1994).

An alternative to a "command and control" approach is pollution prevention. In a pollution prevention approach, a company will seek to eliminate emissions at their point of production rather than at the point of emissions. Thus, instead of a pollution control device being added, production processes and procedures are changed. Under a pollution prevention approach, costs do not necessarily rise, but vary depending upon the individual situation at the plant. Some corporations use environmental audits have been used to assess the potential for pollution prevention at a site (Gottlieb, 1994).

Other companies are experimenting with environmental accounting systems. One such system is full-cost accounting. In such a system, costs that would traditionally be grouped together are broken down according to environmental criteria. For instance, a company may be paying liability insurance since it uses a very toxic material on-site. Under a traditional accounting system this cost would be classified as an insurance cost rather than a cost due to an environmental factor. In a full-cost accounting system this expense would be included in environmental accounts in order to assess the environmental costs of current production (Savage and White, 1995). Environmental audits may be used to generate the information necessary for proper classification of costs under such a system.

Finally, in the last ten years, companies have begun to respond to the idea of sustainability. One such response was the Business Charter for Sustainable Development produced by the International Chamber of Commerce (ICC, 1991). This charter includes a call for companies to improve environmental performance and audits are seen as one way to achieve this improvement.

Six types of environmental audits have been identified. This variety of audit types has led to some efforts to standardize the definition of audits. In the next section three definitions of environmental audits are compared.

The ICC Definition

Efforts to encourage environmental auditing have led to formal definitions of environmental audits. In 1986 the International Chamber of Commerce issued a position paper on environmental auditing that defined an environmental audit as follows:

> A management tool comprising a systematic, documented, periodic and objective evaluation of how well environmental organization, management and equipment are performing with the aim of helping to safeguard the environment by:
>
> (i) Facilitating management control of environmental practices;
>
> (ii) Assessing compliance with company policies which would include meeting regulatory requirements. (ICC, 1986)

Several of the environmental audit types described previously would fit within the ICC's definition.

The EPA's Definition

In a policy statement issued in 1986, the EPA defined an environmental audit as: "a systematic, documented, periodic and objective review by a regulated entity of facility operations and practices related to meeting environmental requirements" (US EPA, 1986). The main difference between the two definitions is that according to the EPA the performer of the audit is a "regulated" entity, whereas in the ICC's terms the performer of the audit is undefined. In the EPA's view, there would be little or no pretext to do audits without regulation. Audits are seen as a voluntary compliance measures. Counter to this view, many developing countries are now requiring auditing as their primary compliance measure (Woolard, 1996). It remains to be seen if auditing alone can produce compliance.

The ISO Definition

As a part of its standards for environmental management (the ISO 14000 series), the International Standards Organization is developing a standard for environmental auditing. Under its proposed definition, an environmental audit is:

> A systematic, documented, periodic, and objective review of environmental operations, management systems, performance, or practice, carried out through a rigorous process of obtaining and evaluating evidence regarding a verifiable objective or assertion about an environmental matter, to ascertain the degree of correspondence with established criteria and then communicating the findings to the appropriate recipient. (ISO, 1995).

Here, the word "objective" now appears twice, once as a adjective and once as a noun. The subjectivity of an audit, and for that matter, accounting, derives from the category and criteria definition. Once goals are set and evaluative criteria developed (both based on knowledgeable but subjective judgments) the review can take place. Objectivity is created by making these subjective judgments explicit.

The addition of the qualification of verifiability in the ISO standard is a reaction to the various activities now being called environmental auditing. Each of the trends in environmental management presented earlier leads to the use of environmental auditing as a technique of evaluating implementation. Hunt and Johnson characterize this as "a confusingly wide range of activities." They describe six specific types of environmental audits:

1. legislative compliance audits
2. liability audits
3. minimization audits
4. product lifecycle audits
5. policy compliance audits
6. environmental management system audits.

Given this wide range of activities they attempt to systematize auditing practice: "only those activities which involve a systematic gathering and evaluation of evidence to test a 'verifiable assertion' can be classified as audits" (Hunt and Johnson, 1993*)*. Hunt and Johnson apply a financial audit criteria to the definition of an environmental audit.

An environmental audit is a methodical review of operations and/or sites according to specified criteria. It contrasts with an environmental impact assessment in the following manner. An environmental impact assessment is an analysis of what <u>will</u> happen against a standard of what should happen. Environmental impact statements estimate the impacts of facilities, policies, and programs and they are produced for public use. Environmental audits measure what is actually occurring and are produced for internal management use. Thus, audits could verify the accuracy

of estimates in environmental impact statements (Gardner 1989). The evaluative function of environmental audits is discussed in Chapter 5.

The Benefits of Environmental Auditing

Environmental auditing is now a common practice. Indicators of the increased level of acceptance are detailed in Chapter 2. The widespread and multiple uses of environmental audits indicate the degree that the private sector benefits from their use..

Improved compliance with environmental laws is cited at the most important benefit of environmental audits (US EPA, 1986). Audits identify compliance problems before they become apparent to regulators. Once a problem is identified, remedial action may be taken. If the regulatory agency identifies the compliance problem, the company can use the environmental audit and any steps toward implementation of audit recommendations as proof of due diligence in solving the problem (Reed, 1990).

Similarly, environmental audits allow companies to identify their environmental progress. An audit may go farther than compliance and show steps made toward a cleaner environment that exceed what is required by law. These results can be used to promote a company's image as a good environmental actor. Since the public places a relatively high value on environmental issues, the reporting of company performance information may be an effective promotion device (Gelfund, 1995).

An environmental audit demonstrates some concern on the part of the company for environmental issues and values. The audit process requires communication and interaction within the organization on environmental issues. These interactions increase workers' education level on environmental priorities both as required by law and as set by the company itself (Morino 1996; Borghesani, 1996).

Finally, environmental audits can lead to significant cost savings within an organization. Environmental audits can identify liability problems that can be addressed before an accident occurs or a claim is filed. The process of bringing a company into compliance reduces potential costs of noncompliance. Often, changes in process operation can be developed that avoid producing emissions at all, thus reducing the need for expensive pollution-control equipment.

Why Should Cities and Regions Perform Environmental Audits?

Environmental management is not only a private company function. Cities and regions perform environmental management functions, too. They operate water and sewerage systems, arrange for solid waste collection and disposal, and develop and maintain parks and transportation systems. The public sector is often one of the largest single contributors of pollution in a region. Cities and regions have compliance and liability problems, and they potentially might apply pollution prevention and environmental accounting techniques to their operations.

As environmental managers, cities and regions must comply with environmental laws. Some observers think that the public sector resists complying with environmental regulations more than the private sector. Wilson and Rachal point out that government agencies apply a less stringent noise pollution standard to their own activities. They argue that governmental bodies are not sufficiently autonomous of each other for efficient regulation (Wilson and Rachal, 1977). If cities and regions resist traditional compliance measures, perhaps voluntary compliance methods such as environmental audits are the way to go for cities and towns.

Even the non-environmental functions of government require some environmental management. A social service agency requires heat and electricity. Agencies often have their vehicle fleets. Goods and services are bought by the agency. These operations must comply with environmental standards. Thus, environmental management is a part of government operation. Where environmental policies affect day-to-day operations, there is a role for environmental audits.

The size of the public sector makes it an important target for environmental management techniques. In diversified economies, the various sectors of government are often the largest single purchasers of any particular type of item. As the largest single agent of demand in many markets, governments can greatly influence the markets for these goods and services. Government purchasing is usually done through a competitive bidding process. Specifications are developed for individual products. Companies must certify that their product meets these specifications when they bid for the supply contract. Thus, if the government specifies a type of office paper produced with a non-chlorinated bleaching process, it increases the demand for this

type of paper. Governments make up a substantial portion of the office paper markets. Purchasing decisions such as this may reverberate throughout the economy.

Governmental influence on market demand contrasts strongly with the influence of individual consumers. The purchases for one household will have a very small effect of the types of goods and services available in the marketplace. One consumer might convince a store manager to keep one item in stock and discontinue another item. Only in a larger campaign, such as some of the "green" purchasing campaigns of the last decade, can the actions of an individual have an effect. In contrast, government purchases are on the order of magnitude to affect systems of distribution, and capital investment. Cities and regions can collectively decide to change their specifications to include environmental considerations. This was done, for example, for office paper by the Council of Great Lakes Governors (Frisch, 1994). Government purchasing can play a key role in the inclusion of non-monetary environmental values in the marketplace. Environmental audits of government purchases could provide the information necessary for greater use of government purchasing power to these ends.

The potential of environmental audits to save money is a crucial factor for local governments. In the United States, Federal grants to state and local governments for environmental and natural resources agency functions in 1994 were at only 45% (in real terms) of their level in 1980 (US Bureau of the Census, 1995). This loss of funding for environmental functions of state and local governments has increased the fiscal strain on local governments. In times of fiscal crisis, some of the environmental roles of local governments are often seen as extraneous and as luxuries. When a city's budget is in deficit, the non-essential functions are cut first. This happened in New York City's fiscal crisis earlier this decade. Parks and recycling were seen as less essential than police and fire protection (NYC Office of the Mayor, 1991). Environmental audits have the potential to increase the efficiency of environmental management within government and identify areas where government can influence environmental performance outside of its own operations.

Ultimately, government should conduct environmental audits because of their role in everyone's life. If the government is not complying with its own regulations, why should anyone else? This non-compliance leads to cynicism. In terms of environmental compliance, the fact

that both New York City and Boston violated the Clean Water Act for years does not encourage others to meet the clean water standards. Environmental laws are political expressions of our shared environmental values (Sagoff, 1988). City and regional governments should demonstrate compliance as an example of what can be done and to encourage others to fully comply.

Cities and regional governments perform environmental management functions. As environmental managers, they face compliance issues and have significant environmental liabilities. Pollution prevention approaches may be applied to city and regional operations. Environmental accounting systems might be set up. Sustainability may be applied to public management of cities and regions. Environmental audits could be used to improve decision-making in each of these areas. If applied, the benefits of environmental auditing found in the private sector might be captured in public sector management. This leads to the central research question of this study: **How can the practice of environmental auditing as developed in the private sector be best applied to the public sector?** The rest of the study addresses this question.

First, the growth of environmental auditing practices in the private sector is explored in Chapter 2. I discuss various environmental management and auditing standards and identify the development of an environmental auditing discipline. Finally, I briefly introduce the major issue in private sector environmental auditing practice.

Chapter Three examines the conduct of environmental audits. Two environmental auditing programs are profiled and a generic model of an audit is described and analyzed. Finally, the elements of successful environmental auditing practice are identified.

Chapter Four reviews two public sector environmental audits. One is the study I performed at CBNS (Frisch and Commoner, 1994). The other is an environmental audit of Lancashire in the United Kingdom (Lancashire County Council, 1991). I will examine the structure of these reports and compare it to the generic model of an environmental audit in the private sector. Were the elements of successful auditing practice followed in these public sector examples?

In Chapter Five, I draw on my profiles of environmental audit practice in both the public and private sector to compare motivations for auditing in both sectors. Why would cities and

towns implement an environmental auditing program? Based upon these analyses, I make recommendations for the application of environmental auditing practice to the public sector. These include the adoption of environmental management policies for government administration.

Chapter 2: The Rise of Environmental Auditing in the Private Sector

This chapter examines the practice of environmental auditing in the private sector. First, general trends in environmental auditing are noted. Surveys indicate that the majority of medium and large companies now have an environmental auditing program in place. This widespread acceptance of the practice has led to the development of a discipline presently establishing environmental audit standards.

The Rise of Environmental Auditing—The Case of Arthur D. Little (DiBerto, 1996)

As measures were taken to enforce environmental laws, companies faced the issue of compliance. Private sector environmental auditing began in the 1970's as a reaction to these enforcement measures. Arthur D. Little (ADL) became a leader in the field when it was approached by the Allied Chemical Company in 1977 (DiBerto, 1996). At the time, Allied was facing a $13.8 million fine for a kepone spill in Virginia. Alarmed at the size of the fine, Allied's board of directors asked ADL to assess its exposure to similar incidents at thirty-eight other facilities. For this evaluation, ADL developed protocols based upon standard procedures in financial audits. ADL reported back that while kepone problems were under control, other potential compliance problems existed at their plants. In response to ADL's assessment, the company developed "a Health, Safety, and Environmental Surveillance Program" to address these deficiencies (Plaut, 1989). This program includes five disciplines: product safety, pollution control, occupational health, loss prevention and environmental auditing. The program evaluates operations and implements remediation measures according to the goals set by corporation policy to:

- design, manufacture and distribute all products and to handle all materials safely without creating unacceptable risks to health, safety and the environment;
- establish and maintain programs to assure that laws and regulations are obeyed;
- adopt its own standards where laws or regulations may not be adequately protective. (Kent, 1989)

At Allied-Signal, ADL assists in corporate policy development, participates in environmental auditing, and consults on environmental management issues (DiBerto, 1996).

After its work with Allied Chemical, other chemical companies approached ADL to perform environmental compliance audits. This led to the formation of the environmental auditing practice in the consulting firm. The US government also approached ADL to study the new practice. In the mid-eighties, ADL wrote the first three EPA publications on environmental auditing including the study that supported the development of the ***1986 Policy Statement on Environmental Auditing*** (US EPA, 1986).

Today, ADL's environmental auditing staff consists of thirty-two full time employees. ADL draws on other staff when relevant technical expertise is not available in the environmental auditing staff The unit has conducted over 5,000 audits since the 1970's and continues to conduct 350 audits a year. Recently the focus of environmental auditing activities is shifting from compliance auditing to environmental management systems auditing. ADL's work has become increasingly international with recent environmental audits conducted in China. As most medium and large companies now have environmental auditing programs in place, ADL has shifted its focus by providing environmental audit program management assistance, training of environmental auditors, and value-added products such as ready-to-use environmental audit protocols and software (DiBerto, 1996).

The Practice of Environmental Auditing in the Private Sector.

The practice of environmental auditing in the private sector as a whole mirrors the experience of Arthur D. Little. Before the late 70's, internal audits with environmental objectives were only occasionally undertaken. ITT reports a quality auditing program in the 1960s with some environmental objectives (Wooley, 1989). Petrochemical companies were the first to turn to environmental auditing as a part of an environmental compliance program. For example, British Petroleum reports its first environmental audit in 1972 (Cowell, 1989). Initially, environmental auditing was often just a site evaluation and not connected to a formal program of environmental auditing and management. Polaroid occasionally conducted audits throughout the 1980's but didn't begin a comprehensive program until 1989 (Borghesani, 1996). In the mid-to-late 1980's

environmental auditing spread to other types of companies. For example, Raytheon started its program in 1988 (Merino, 1996). A 1994 survey of environmental accounting and reporting practices of US companies found that 73% of responding companies had implemented environmental auditing programs (Price Waterhouse LLP, 1994). In a similar survey just two years earlier, only 40% of respondents had an environmental auditing program in place (Ibid.)

The growth of environmental auditing in private industry in Canada follows a pattern similar to the United States. A 1984 Canadian Government survey found that 25% of survey respondents had environmental auditing programs in place (Reed, 1990). A follow-up survey designed to collect comparable information in 1991 found that the number of private-sector respondents with environmental auditing programs in place had increased to 76% (Thompson and Wilson, 1994). The practice of environmental auditing may have spread earlier in Canada than in the United States.[1]

Environmental auditing did not spread to other parts of the world until the late 1980's and early 90's.[2] International subsidiaries of US companies (such as Ford and GE) were the first to apply environmental auditing practices in Europe (Woolard, 1996). While compliance with environmental laws and corporate policies seems to be the main motivating force in the United States, the issues of corporate environmental reporting and sustainability are additional motivations for environmental auditing in other parts of the world (DiBerto, 1996).

An International Auditing Practice—The Case of ERM (Woolard, 1996)

Environmental Resources Management Inc. has been conducting environmental audits since 1984. This work started in the United States but spread to the United Kingdom and Europe around 1989-90. Ten employees are directly involved in its auditing unit and the company conducts 200 to 300 audits a year involving 400 to 500 sites. The big growth in ERM's work has come from financial transactions related to privatization in Eastern Europe and the former Soviet Republics and from liberalization of foreign investment policies elsewhere. The bulk of ERM's environmental auditing work is in Europe, but audits of sites in Russia, China and India have been

[1] Reports of surveys did not provide enough information on survey techniques to know if this difference is either significant or due to sampling bias.

[2] Early examples of early non-US environmental auditing practice include BP.

conducted. Due diligence and compliance audits comprise 70% of ERM's audit work. Audits of environmental management systems account for the rest (Woolard, 1996).

The Rise of Environmental Auditing Standards

The broad acceptance of environmental auditing in the private sector is reflected in the development of standards for auditing practice and regulatory review of audits. In the United States, EPA has issued two policies on environmental audits and the Department of Justice has addressed the use of environmental audits in prosecutorial procedural rules. Canada started with a similar environmental audit policy and discusses auditing within the context of sustainability. The European Community has developed standards on environmental management systems and the International Standards Organization is developing an environmental management series (ISO 14000) that includes standards for environmental audits. I will briefly describe these standards.

US Standards

The EPA's 1986 Statement on Environmental Auditing has some elements of practice standardization. The Statement defined what an environmental audit is and noted the elements of a successful environmental auditing program. The statement encouraged the use of environmental audits, while stating that the Agency "will not promise to forego enforcement activity". The Statement noted that routine EPA requests for audit reports in enforcement actions would "inhibit auditing in the long-run" (US EPA, 1986).

Since the 1986 EPA Statement, governmental standardization activity in the United States has been in the form of regulatory policy on the use of environmental audits in compliance actions. In 1991, the Department of Justice issued new sentencing guidelines (US DOJ, 1991). These sentencing guidelines committed the Department of Justice to recommending reduced fines in cases where violations were identified through a company environmental audit and then self-reported. Factors contributing to the leniency of DOJ actions on cases of self-reporting include: the pervasiveness of non-compliance, the internal disciplinary system, preventative measures, the timeliness of cooperation, remediation efforts and the aid given to the government in the investigation (Weisenbeck and Casavechia, 1992).

The EPA adopted a new policy on self-reporting of noncompliance incidents found through environmental auditing in January 1996. The EPA's policy committed to seeking reduced fines for companies that self-reported violations found through environmental auditing (US Federal Register, 12/22/95).

Canadian Standards

Canada actively promotes environmental auditing in private industry and in its own operations. In 1988, It issued a position statement similar but shorter than EPA's 1986 statement (Environment Canada, 1988). This statement commits the agency to promoting the use of environmental audits to increase compliance. An environmental auditing development guide and sample protocol has also been written by the Federal government. (Environment Canada, 1992a, 1992b). Canada was a very active participant in the 1992 Earth Summit. Conferences and commissions have raised the issue of sustainability at the national, provincial and local levels (NRTEE, 1993). Environmental auditing is seen as a way to evaluate progress toward locally generated sustainability goals.

British Standards

Environmental auditing standards in Britain arose from several sources. The Friends of the Earth had a campaign that promoted green practices in businesses and government. Second, the Brundtlund report increased awareness of the ideas of sustainable development (WCED, 1986). Local government activists influenced by this report applied these ideas to their own communities. The development of environmental auditing standards came after the Federal Government's White Paper on the Environment in 1990. The British Standards Institute developed BS 7750 as an environmental management systems standard to encourage environmental practices and auditing. These require companies to document compliance with "legislative and regulatory requirements," environmental effects produced by their operations, existing environmental management practices and procedures, and investigations of previous noncompliance incidents. Independent auditors perform periodic environmental audit to verify the documentation. (Hall and Tockman, 1995)

Other Countries

Newly industrialized and developing nations are also initiating environmental auditing policies. Singapore actively promotes environmental auditing (Johnson, 1995). Environmental self-audits are mandatory in India and Brazil (DiBerto, 1996). The requirement of environmental audits in these nations may be a way to encourage compliance without developing the same degree of environmental regulatory infrastructure on the part of government. I do not believe that audits alone will lead to compliance. These programs raise interesting research questions.

The European Union Standards: Eco-Management and Audit Scheme (EMAS)

The European Union has developed its own standards for environmental audits under the Eco-Management and Auditing Scheme (EMAS). Under EMAS, sites can register for certification if they provide "credible environmental performance information for public scrutiny" (Hilliary, 1995). These standards require reporting of a significant amount of environmental information. This environmental performance information must be the product of regular on-site environmental and the reporting itself should be audited as proof of verification. The European standards for environmental management arise out of British Standards BS-7750. They differ from the British standards in that sites are audited in EMAS and companies are audited in BS-7750 (Hall and Tockman, 1995)

The ISO 14000 Standards

The International Standards Organization is an international body that develops standards to promote trade of goods and services. The United States is represented in this organization by the American National Standards Institute. The ISO traditionally developed technical standards for manufacturing. More recently the organization has been developing standards on quality control (ISO 9000) and environmental management systems (ISO 14000). The ISO 14000 standards include recommendations for environmental auditing (Bell, 1995). Environmentalists are concerned that the ISO standards just require an environmental management system without detailing the requirements. Companies that have already developed significant environmental management systems may be at a disadvantage since their standards may be more stringent than the ISO standards (Prince-Roberts, 1996). The ISO is developing standards for environmental audit performance and for environmental auditor qualifications (Hall and Tochman, 1995).

A Developing Discipline of Environmental Auditing

The practice of environmental auditing combines the skills of several professions including accounting and engineering. The engineering professions are very active in the international standards organization. Professional accounting groups have recently begun to address the topic of environmental accounting in terms of how environmental issues are included within an internal review. The Canadian Institute of Chartered Accountants produced one of the earliest reports from this perspective. They examined to what extent environmental auditing fit their definitions of auditing. They concluded that most environmental audits would not fit their financial audit definition, but third-party verification audits of environmental management systems comes closest to meeting the traditional accounting standards of good audit practice (CICA, 1992). Several of the largest accounting firms, including Coopers-Lybrand and Price-Waterhouse, now provide environmental management systems auditing services.

Environmental auditing has its own professional organization, separate from these professional accounting groups. The Environmental Auditing Roundtable has been in existence since 1982 and has grown from twelve members to over one-thousand members (EAR, 1996). The organization holds meetings, develops policies and is drafting auditor standards. While an independent academic journal of environmental auditing does not exist, articles on the topic appear in the journal ***Environmental Management***, and in the periodicals: ***Total Quality Environmental Management*** and ***Business Strategy on the Environment***.

The Controversy over Shielding of Environmental Audits

Should environmental audits be shielded from use in environmental prosecutions? As seen in the discussion of their standards, both the US EPA and the US Department of Justice are committed to finding ways to encourage self auditing. Yet, both entities reserve the right to subpoena environmental audit documents in rare cases when these documents will add to proof of willful violations. This question has been the most controversial issue within the emerging practice of environmental auditing.

Successful environmental audits will find and document instances of noncompliance with environmental laws and regulations. In normal operations, once a problem is discovered, it

requires time to fix. The prosecution of companies making good faith efforts to resolve their noncompliance problems may defeat the purpose of environmental auditing. The threat of prosecution may be more than companies are willing to risk.

The most famous example is the Coors case (Gerrard, 1996). Through an environmental audit, Coors discovered "a significant level of volatile organic compound (VOCs) emissions" at one of its plant sites. At the time VOCs were not a recognized as a common air pollution problem in beer brewing processes by the Coors company and the beer industry in general. The company reported its results to Colorado enforcement authorities. Coors tried to argue that the fact that they did the audit should exempt them from prosecution. The audit was used by environmental authorities to justify an enforcement action for the violation. The company ended up paying a fine of $237,000 for the violation (***BNA Environmental Reporter***, 6-24-94)

The Responsible Corporate Officer Doctrine

The standards of proof necessary for an environmental enforcement action depend upon the type of violation. Issues addressed by the courts include various degrees of knowledge and intent. Generally, environmental prosecutions require some degree of knowledge but a very low degree of intent. Under the responsible corporate officer doctrine, corporate officers can be held responsible for activities that were the responsibility of their employees as long as there was some internal notice of conditions. This doctrine has been incorporated into enforcement provisions of the Clean Air Act and the Federal Water Pollution Control Act (Cooney et. al., 1995b)

Due Diligence?

A successful environmental compliance audit will identify areas where violations may be taking place. An officer who receives the environmental audit becomes a responsible corporate officer under this enforcement doctrine. The concept of due diligence comes about in terms of the degree of the response to the knowledge that a violation may exist. Some violations can be corrected right away; others may take a capital investment. If a corporate officer ordered the equipment necessary to correct a problem as part of an environmental audit implementation plan, does that constitute due diligence? Due diligence is the concept that taking measures to ensure

compliance is the reasonable equivalent of being in compliance. While not in compliance now, such measures (under due diligence) must lead to compliance.

Audit Shielding Laws

In response to these liability concerns, companies have been lobbying states to pass shielding laws. These companies include paper, chemical, energy, and waste management companies. Several coalitions are also involved: "Compliance Management and Policy Group," " Corporate Environmental Enforcement Council," and the "Coalition for Improved Environmental Audits." Eighteen states have now passed such laws. The net impact of these laws is that they allow companies to withhold information. Several State Attorney Generals have begun lobbying against these laws as they limit their authority to enforce environmental legislation. Under the new EPA policy on environmental audits, self-reporting leads to reduced penalties rather than protection from prosecution (US Federal Register, 12/22/95). Fifty companies have now come forward and few have faced any fines. EPA is also threatening to withdraw environmental law enforcement authority from states whose shielding laws "undermine enforcement of Federal laws" ("Many States Give Polluting Firms New Protections" ***New York Times*** 4/7/96 p. 1, 16.)

If a company's sole purpose in doing environmental audits is compliance, audit shielding is a big issue. Yet according to both ERM and ADL, and as shown in the Raytheon case study in the next Chapter, corporations now perform audits of environmental management systems that include much more than compliance goals. The extent of controversy over any prosecution of self-reported incidents may reveal the extent that fear of criminal prosecution motivates environmental auditing in the private sector.

Chapter 3: What is a Successful Environmental Audit?

Successful environmental auditing is the result of two factors: a strong environmental management program and an effective audit design (DiBerto, 1996) In this section two corporate environmental auditing programs will be briefly profiled. Then the design of audits will be discussed with an emphasis on practices that are effective. Finally the elements of successful programs will be detailed.

Environmental Auditing at Polaroid (Borghesani, 1996)

Polaroid has had an environmental auditing program since 1989. At the time the program was started, the company was recovering from an environmental compliance action in 1986 and a corporate campaign against the company initiated by Greenpeace USA. Polaroid began a Toxic Use and Waste Reduction Program in 1987 that applied pollution prevention principles to its operations (Nash et. al. 1992). The initiation of environmental auditing was part of this company wide effort to avoid further prosecutions by institutionalizing environmental activities and to counteract the negative publicity engendered by its compliance problems.

Today the auditing program operates on an estimated budget of $500,000 with staffing equivalents of between 5 and 10 employees. The number of auditing staff equivalents is greater than that since auditing has been incorporated as one part of many employee's job descriptions.. The focus of the auditing program is on compliance with RCRA and with US Department of Transportation materials transport regulations. Audits are coordinated by a committee out of corporate headquarters. The Chairman of the committee is an environmental health and safety professional who oversees audits, and determines which risks, topics and sites merit auditing.

A team of three, including a representative from corporate headquarters and a site representative, does the actual auditing. Audits take about a week to accomplish. Findings of an audit are presented at a closing meeting with the site representative and site management in attendance. This allows for a site-based response to the audit findings. Audit findings are ranked as to their level of importance. A finding classified as a "threat" requires an immediate response. Other findings take longer term implementation measures to rectify. A written final report including the response of the audited site is required thirty days after the closing audit meeting of

the audit. The final report is carefully written to avoid audit findings that might implicate corporate management in violations of environmental law since "everything is discoverable." The metrics (actual measurements collected during the audit) are collected by the chairman of the auditing committee. These data are then used to assist decision-making about future audits. The data are not reported in the audit document. This step somewhat insulates management from responsibility for violations .

It is "hard to get a direct correlation" between auditing and actual changes in corporate practices at Polaroid; but "there's no question about it" that it has had a beneficial effect" (Borghesani, 1996). Audits are preventative. The process of auditing educates site operations as they are undergoing the evaluation. As site employees learn about the audit, practices are improved and environmental goals behind practices are reinforced.

Environmental Auditing at Raytheon (Marino, 1996)

Raytheon began its environmental auditing program in 1988 and is implementing a revised audit program this year. From 1988 through 1995, Raytheon's program focused on compliance with environmental laws and corporate environmental policy. This program was housed in the corporate environmental, health and safety offices at company headquarters. Audits of the company's 75 facilities were conducted in a regular five year cycle, with more risky facilities being audited more frequently. Topics in this system were broken down by media categories such as air or electrical safety. A staff of seven, four with environmental expertise and three with health and safety expertise, conducted the audits under this system. Formal audit reports were required and were assumed to be protected under attorney-client privileges. This led to indirect statements of audit findings in the manner of "a potential problem may be occurring" instead of clear statements describing present conditions. One copy of the report went back to the audited facility and another went to corporate headquarters. The company has not quantified the benefits of the auditing program but notes that "if it just re-focuses people on environmental priorities and procedures, auditing is worth the effort" (Marino, 1996).

This year the company is embarking on a new environmental auditing strategy—environmental management systems auditing. Under this system, environmental audits examine

issues beyond compliance with environmental laws and company policies. This type of auditing strategy requires "the development of written environmental goals and testing of management systems as part of the business agenda" (Marino, 1996) Auditors identify cross-media connections such as the connections between environmental policies and occupational health and safety regulations.

Instead of a centralized group at corporate headquarters being the only staff involved; environmental auditing is becoming part of the job of the environmental, health and safety officers at the each of Raytheon's sites. They are meeting and training together for this new part of their jobs. Audits will be conducted by a groups of 4 or 5 officers together at the site. Officers from other sites are brought in to assist with audits. The corporate environmental, health and safety staff in company headquarters who used to conduct the audits are now training these staff members and will assistant in the team audits. Two audits will be conducted per month, putting each site on a two to three year audit cycle. This teamwork will allow for more sharing of experiences (both good and bad) at sites within the corporation. It is hoped that this process will lead to continual learning and more professional staff development.

The results of these group audits will no longer be reported in formal audit reports. The reporting of findings is now organized in a tabular format with a rating system. Opportunities for pollution prevention are highlighted in this new format. The findings and recommendations of this new auditing format will be more widely disseminated in the company and will be given to top management.

The Structure of Successful Environmental Audits

The environmental auditing experience at Raytheon and Polaroid illustrates the general approaches taken by many companies to environmental audits. The work in an environmental audit can broken down into three stages. The first stage is the design stage. This stage includes the decision to conduct an audit, the development of audit protocols and standards, and the identification of operations to be audited. The second stage is the performance of the environmental audit. This stage includes a pre-audit meeting, interviews, and site visits. Depending on the type of audit, it can also include the measurement of environmental data. The

third stage is the evaluation and reporting stage. In this stage the preliminary results are developed and evaluated. Conclusions may be reported formally or informally. The audit team ends its work with the preparation of a final report that includes an action plan to address the findings of the audit.

Stage One: Preparing to Conduct an Environmental Audit

There are six key elements to effective audit design: objectives, organization, staffing, scope, coverage and approach (DiBerto, 1996).[3] The most important element is the setting of clear objectives. This point is stressed again and again in my interviews with auditors and in published reports of environmental auditing (Blattner, 1994; Cahill, 1994; DiBerto, 1996; Kornreich, 1995, Budzik, 1995; Pelletier, 1990, Ledgerwood, 1994; US EPA, 1986; Plaut, 1989; Kinworthy, 1989; Woolard, 1996; and Marino, 1996). As audits are initiated by company management, their needs determine audit objectives (Greeno, et.al. 1987).[4] Audit goals and objectives can take many shapes including the following: determination of compliance status, improvement of overall environmental performance, the identification of cost-effective measures to achieve compliance, increasing environmental awareness, identifying risky conditions and documenting due diligence (Greeno, et. al. 1987) Whatever objectives are chosen, they must be achievable and justifiable (Kissuk, 1990). **Successful audits have clear, achievable and justifiable goals**.

Scope and Coverage of the Audit

The objectives for initiating the audit determine the audit's scope. The scope includes issues of geography, industrial organization, and functional areas such as air, water or environmental safety. The objectives and the scope determine the coverage of the audit. For instance, if a manager sees increasing environmental liability insurance costs within the industry, the manager could audit the firm to see the extent of exposure. Or if a new environmental regulation is passed a manager could audit operations to see the extent that these new regulations

---

[3] DiBerto, 1996. Based upon a diagram drawn in an interview conducted on May 1st, 1996.

[4] Although the idea of labor initiating an environmental audit is an interesting one. In a restructured enterprise with a commitment to total quality management and team work, one could easily envision work teams initiating environmental audits as part of a redesign process within a company. In an enterprise with unionized labor, and antagonistic labor/management relations you could imagine a union doing an audit as a way to compile information on health and safety for use in collective bargaining.

would affect the firm. Audits can be conducted on an operational basis, a regulation basis, a liability basis, a policy basis, etc. An environmental audit of an operation would entail a determination of the environmental regulations (and/or company environmental policies) regarding that operation. An environmental audit on a regulation basis would examine the compliance of all operations on a site with a specific regulation. Whatever the type of environmental audit, the scoping should include considerations of the depth of the assessment, confidentiality issues, management support, timing and budgetary considerations (Pelletier, 1990).

Organization and Staffing

The objectives of the audit also determine the organization of the audit. This includes issues such as where the operations and site are located, and other logistics. These organizational needs help to determine the number of auditing staff (depending upon the detailed coverage of the audit). The type of organization helps to determine the types of skill needed on the audit staff. Typically these include occupations such as industrial, chemical and environmental engineers (DiBerto, 1996). Expertise was repeatedly cited as an element of good auditing (Budzik, 1990; Pelletier, 1990; Ledgerwood, 1994; US EPA, 1986; Kent, 1989; Graham-Bryce, 1989; Kinworthy, 1989; Tomilla, 1989; ICC, 1986; DiBerto, 1996; Borghesani, 1996) The types of expertise needed can be broken down into four categories: technical competence, knowledge of auditing functions, knowledge of facility operations, and knowledge of what other companies in the same industry are doing (DiBerto, 1996). **Successful audits are conducted by staff with the expertise to assess the status of operations**.

Applicable Standards

Given the objectives for the environmental audit, standards against which present practice can be measured are identified. Generally, the standards used within an environmental audit are the standards required by an environmental regulation or by a company's policy. Once a standard is identified, the company's records should be reviewed to get an understanding of past performance. Chollack identifies three types of documents to be examined: administrative, regulatory, and technical (Chollack, 1990) Administrative documents cover issues of firm organization, employee training, and management memoranda. Regulatory documents include the

various environmental laws and regulations regarding the operation or process; and they include all plant specific permits correspondence and inspection reports. Technical reports include facility-level information on issues such as process engineering and site plans.

Protocols

With this information, protocols are developed regarding measurement and evaluative techniques that will yield useful data for each standard. An audit is an opportunity to get more detailed (and more revealing) data than what may be required in a environmental operating permit. Some audit practitioners develop questionnaires. These questionnaires incorporate questions about operational management that determine the environmental performance of the process being measured. Questions regarding awareness of environmental standards should be included. The process of asking about environmental standards will reinforce other environmental education efforts within the firm. Other practitioners avoid questionnaires. Questionnaires can be too easily filled out at a desk. Instead, these practitioner's protocols give a detailed approach to the conduct of the audit. They ensure that when leaks are to be noted in hazardous waste storage containers, the auditor checked for leaks at the site. Such an approach increases consistency and improves data quality. (DiBerto, 1996). Audit experts and practitioners frequently mention quality control and consistency as key aspects of an audit (Pelletier, 1990; Ledgerwood, 1994; US EPA, 1986; Plaut, 1989; Graham-Bryce, 1989; ICC, 1986). Auditors can build in mechanisms in assessment design that allow for unexpected findings. **Successful audits are concerned about the consistency and quality of the data collected**.

Stage Two: Conducting the Audit

The performance of the environmental audit puts the previously developed protocols into use. A typical audit consists of five key parts: a pre-audit meeting, a facility tour, measurement of environmental data, interviews with operational and management personnel, and follow-up visits to the audited location. I describe each of these parts in further detail below.

1. The Pre-Audit Meeting

A pre-audit meeting brings together the full staff of the audit for the first time. Often a key manager in the audited operations and a representative of higher level firm management will

also attend. The meeting should cover two key topics. First the meeting reviews site operations and audit objectives. Second, the responsibilities of each staff member and/or team should be presented. The meeting should also review audit protocols and deadlines.

2. The Facility Tour

The site work of an environmental audit begins with a facility tour. Either a tour is prearranged with local management or local management is notified of a pending environmental audit with the understanding that the audit team could show up unannounced. The tour allows for visual inspection of operations. Site management should answer any initial questions about unexpected findings during the tour (Blumenfeld, 1989).

3. Interviews

The audit team should interview staff at all levels of facility operations. Auditors should give careful consideration to questions of confidentiality and job security in this process. Interviews should include questions about operations, unusual incidents, management decisions, and knowledge about environmental policy and regulations regarding the operations being audited. Written records of the interview may be shared with the interviewee as a check for accuracy.

4. Measurements

The measurement of environmental data in the auditing process should follow the written protocols. Auditors should note any deviation from prescribed practices. The type and duration of measurements depends largely on the objectives of the audit. Some audits may require strict scientific data collection while others may just require a review of recorded measurements. This step requires technical direction and supervision.

5. Preliminary Data Review and Follow-Up Visits

Data collected during the audit should be recorded as the audit proceeds. This allows preliminary review of the data. Auditors note any unexpected measurements or labor practices. More information on these items is often necessary for full understanding of operations. Audit staff collects this information on follow-up visits.

Stage Three: Reporting the Results of the Audit

The results of the audit are developed by comparing the information collected during the conduct of the audit with the standards of good operational practice identified before the start of the audit. These results are reported in at least two forms: a preliminary report and a final report.

The Preliminary Report

The preparation of a preliminary report is an important step. Preliminary results from the audit are shared with operational staff of the operation audited. The results should include recommendations, findings, and exceptions identified. Recommendations should address compliance, improvements to administrative procedures, operating practices and increasing environmental awareness (Chollak, 1990). The findings should note both positive and negative aspects of operational management. Audit staff should carefully report negative audit findings. One book even suggests a list of twenty words and phrases (such as "perjured" and "gross negligence") that should be avoided in an audit report (Greeno, et. al. 1987) Notice of the regulations or policies behind an identified exception should be noted (Blumenfeld, 1989).

The preparation and presentation of a preliminary audit report allows for operational staff to respond to any criticism of their management. They may improve their operations immediately, before the final results are reported to company management. These changes might be defensive in nature. Management of the audited operations should prepare a response to the preliminary report. This response should be incorporated into the auditing records.

The preliminary report may also be shared with a company's legal division. This was the practice at Raytheon before they began their new auditing program this year. (Marino, 1996) A company's lawyers draft comments on the legal implications of the audit findings. These comments are used to prioritize implementation proposals and they can be incorporated into the final audit report.

The Final Report

The production of the final report is the last step of the audit. This report formally summarizes the finding and is a crucial step in the audit (Pelletier, 1990; Cleghorn, 1990; Holliday, 1990; US EPA, 1986; Woolard, 1996) The final report should incorporate the responses

to the preliminary report. Any inaccuracies found in the preliminary report are corrected. Findings of the audit should be prioritized as is done by Polaroid (Borghesani, 1996). Some auditors produce a letter of summary judgment following financial auditing practice (DiBerto, 1996).

The final report is developed for company management, operational management and legal counsel for the company. The report can be written or oral. Often only a summary of the report is sent to top management. Detailed findings are shared with the appropriate operational managers. Findings of an audit should also be reported to the manager responsible for plant or site engineering and design (Lenox and Ehrenfield, 1995). **A successful audit has a clearly written final report with prioritized findings.**

Implementation Plan

The implementation plan is the most important part of the final report of an environmental audit. The goal of an environmental audit is not just to compile information. An environmental audit is a step toward finding better methods of environmental management for continuing operations. Thus, the detailing of specific actions and changes to correct problems discovered in the audit is crucial for audit success (Blattner, 1994; Johnson, 1994; Kornreich, 1995; Levin, et. al. 1994; Pelletier, 1990; Peel, 1990; Holliday, 1990; Ledgerwood, 1994; US EPA, 1986; Thompson, 1994; Tomilla, 1989; ICC, 1986; Woolard, 1996; Marino, 1996). BFI uses a computerized auditing reporting systems that has an automatic implementation module for each audit finding (Johnson, 1994).

An audit may find that a portion of operations is in noncompliance with environmental laws and regulations. companies need proof of efforts to correct such exceptions as protection from environmental prosecution. An implementation plan should include specific measures and a schedule. Operational managers may want to document their remediation efforts via progress reports. **Successful audits require an implementation or action plan to address each of the audit's findings**.

Auditing as a Part of a Successful Environmental Management Program

The previous section detailed the activities of an environmental audit. Five critical components of successful audits were identified. Yet, in practice, audits are not as straightforward as this model might suggest. Environmental auditing practice differs from company to company on issues such as who should conduct the audit, how confrontational should the audit be within the organization, the confidentiality of the environmental audit report. In the next section, I briefly present an example of a failed auditing program and note aspects that may have led to its failure. Finally I analyze elements of successful auditing programs address issues such as the support of top management, commitment to process at the line level of organization, communication and independence of audit function.

The Tone of the Audit—A Case of a Failed Auditing Program

An environmental audit should be critical in order to be successful. The emphasis on pre-determined protocols attempts to preserve the critical nature of an audit. Audits may end up being a method whereby top management in a firm may blame environmental problems on lower management (Holliday, 1990). Companies may cynically perform audits to improve public relations without actually remediating problems in company operations. One example of such an audit was uncovered by Rappaport and Flarerty in one of their case studies of corporate responses to environmental challenges:

> A consulting firm did environmental audits at facilities throughout the Division. They were even paid for by corporate headquarters. Never was there a follow-up on the audit by corporate [headquarters]. Only about half of the sites have a plan to execute the recommendations in the report, and in fact, no one has told the facilities they have to follow up. Most of the recommendations are very straightforward because it was so easy to find recommendations to make. The plants did not ask for the audits, so they just filed them away and did nothing with them. (Rappaport and Flaherty, 1992)

This example raises several programmatic issues for auditing practice. First, how strong was the commitment of the company to environmental auditing and management in the first place? There is a communication and management problem. Someone at company headquarters initiated the audits without communicating their importance locally to the site. At the plant there may be no

commitment to the process, so the reports are just sitting on the table. A successful auditing program would address these issues and follow up on audit recommendations.

Top Management Support

Developing an environmental auditing program is not without risks. Audits may identify violations of environmental, health and safety laws and regulations. Unlike Rappaport's example, there must be a strong organizational commitment to pursue and correct exceptions found in audits. Usually this sort of organizational commitment is expressed through the development of a corporate environmental management policy (Younghusband, 1990). The ICC statement on auditing lists the following items as necessary components of top management support: personal interest and concern, allocation of appropriate staff and resources, and commitment to follow-up on recommendations (ICC, 1986) The EPA auditing statement stresses the importance of an explicit policy (US EPA, 1986). **Successful auditing program have strong explicit support from top management.**

An auditing program must address the needs of top management in order to get support. Today's board members "want assurances that they are directing an organization that is a 'good corporate citizen' and is also controlling costs to protect stockholders interests. And they want to *know* the corporation's compliance status" (Greeno, et. al. 1987, p. 34). Audit programs produce information that may inform each of these priorities.

A commitment to environmental auditing from top management may entail the development of incentives within the corporate structure leading to productive audits. These incentives may include monetary bonuses for rapid completion of audit action plans or promotion into management for successful audit staff (Holliday, 1990)

Communication in Auditing Situations

Good communication is essential in an audit. It is important to note the successes at the audited site. Ledgerwood et. al. calls this a "positive audit", where good practices are sought out and given "immediate recognition and publicity" (Ledgerwood, et.al. 1994, p. 35). At Allied Signal, time is set aside during each day of an audit for audit staff to talk about concerns and share information (Plaut, 1989). At ITT, the auditing program comes out of headquarters while

the responsibilities for environmental management are local and reside with line managers. Thus, maintaining good communication between auditor and auditee may avoid battles over "turf" (Wooley, 1989). In international work, communication is especially important in order to understand cultural differences in environmental management (Woolard, 1996) **Successful audit programs maintain good communication among audit staff and between auditors and auditees.**

Commitment to Environmental Management at the Audited Site

The Rappaport example of an unsuccessful audit showed a lack of commitment to the auditing process at the line level. Finished audits just sat on the shelves when many of the recommendations could have been easily implemented. The biggest "performance gaps" in auditing programs comes about from this lack of commitment (DiBerto, 1996) Thus, the commitment to environmental auditing must extend down to the audited plant or operation. **Successful auditing programs require some commitment to the auditing process from the level of operation being audited.**

The Independence of the Auditing Function

When a company embarks on an environmental management program with environmental auditing, the company has to figure out who will perform the audit. Three possible ways of performing the audits include the hiring of outside consultants, the hiring and training of an internal environmental auditing staff and self-auditing.

There are advantages and disadvantages to hiring consultants to perform the environmental audit. Probably the biggest advantage of hiring a consultant is that a company does not have to hire its own staff or enlarge the responsibilities of existing employees. Environmental consulting firms such as ERM and Arthur D. Little have performed hundreds of audits (Woolard, 1996; DiBerto, 1996). By hiring such firms, companies are assured of an experienced audit staff and detailed technical expertise. Outside consultants can bring a fresh perspective to the operations being audited. They bring knowledge of easy improvements in administration and in process control that come from repeated audits of the same type of facilities in an industry. The lack of connection to the company and to the internal operation being audited is also a drawback.

Once the audit has been performed, an outside consultant cannot do the sort of detailed follow-up necessary for the implementation of recommended actions. Probably the biggest disadvantage of hiring consultants is the expense. Finally, some internal operations may involve trade secrets, or sensitive processes. In these cases, companies may think twice before inviting outsiders to review operations.

Companies often set up their own environmental audit operations. Whether or not a company hires staff solely to perform environmental audits depends upon the size of the company, the commitment to environmental management, and the complexity of the operations to be audited. Environmental auditing may occur during seasonal lulls in company activities. In these cases, firms may opt to train existing employees in audit procedures. The essence of a separate environmental auditing operation is having one part of the company examine another. Often a management committee oversees the direction of the audit. Typical issues decided by an oversight committee at Unocol Corporation include: interpretation of government regulations, revisions to audit protocols, training of audit staff, conflict resolution in cases of disputes, and checking the "adequacy" of action plans produced with the audit (Kinworthy, 1989). A similar structure exists at Polaroid (Borghesani, 1996).

A third way to perform environmental audits is to require self-auditing. In self-auditing, operational employees and management for the site or process being audited take charge of performing the audit. This model requires teamwork and trust to be effective. A certain degree of labor-management cooperation is necessary. In this sense, self-auditing models total quality management methods now being implemented in many firms (Cohen and Brand, 1995). It also requires wide acceptance and understanding of environmental policies and priorities.

Some companies combine aspects of each of the previous models of environmental audit performance. Consultants may be hired to provide technical and process assistance. An environmental auditing manager might train local staff in audit performance as Raytheon is now doing (Marino, 1996).

Finally, mature programs may want to audit their audit programs. Such an audit would check to see that good auditing practices are being maintained from audit to audit. This entails

checking for consistency in audit protocols, common metrics, and training in audit staff. In these cases, it is probably good practice to go outside of the organization to get assistance. Coopers-Lybrand, Price Waterhouse and Arthur D. Little provide this service to several large companies (Savitz, 1996; Petracca, 1996; DiBerto, 1996). This process is very much like an financial audit of the accounting function of a company. **Successful audit programs have addressed what degree of audit independence is right for their organization**.

Summary of Findings about Successful Audit Practice

Successful environmental audit programs in the private sector have strong support from top management, good communication throughout the organization, some commitment to the auditing process at the plant and production line level, and a degree of independence in order to objectively judge what is being audited. Successful audits produced by such a program have explicit goals and objectives, are accomplished by professionals with the expertise to judge what is going on, have consistent protocols to ensure quality control in audit findings, have clearly written final reports, and have action plans produced with the full intent to carry out remediation procedures.

Chapter 4: The Emerging Public Sector Environmental Auditing Practice

The practice of environmental auditing is still new to the public sector. In this chapter, I first look at precedents to public sector environmental auditing. Then trends in public sector auditing are identified. Relatively little public sector auditing practice is taking place. I present two examples of this emerging field. The first example is from the United Kingdom and takes a broad approach to public sector auditing. The County of Lancashire conducted an environmental audit of the county in 1989 leading to the report: ***Lancashire - A Green Audit*** (Lancashire County Council, 1991). The second example is from the United States. In 1992-93, the Center for the Biology of Natural Systems conducted an environmental audit of the budget of the City of New York with support of the Jessie Smith Noyes Foundation and the Surdna Foundation. The report, ***An Environmental Audit of the New York City Budget*** was released in February 1994 and comprises a review of internal environmental management activity (Frisch and Commoner, 1994). These audits pose two different approaches to environmental auditing in the public sector. After describing each case, I analyze the differences between these examples of audits in the public sector versus successful environmental auditing in the private sector.

The Developing Public Sector Auditing Practice

Public sector environmental inventories and plans have been around for a long time although environmental auditing is only a decade old.. Regional surveys were essential parts of the methods of early planners such as Patrick Geddes who wrote and worked in the early twentieth century (Hall, 1988). Environmental data were often collected in these plans and initiatives, but existing environmental practices were not evaluated. Plans without a continuous feedback loop of evaluation and implementation will only end up sitting on the shelf. Environmental audits are an evaluative tool that can assist in integrating information collected in regional surveys, inventories and plans, and actual environmental operational practice.

The US Council on Environmental Quality, an agency working under the Executive Office of the President, was established under NEPA in 1969. Part of the Council's role is to publish an annual Environmental Quality Report. Part of this report was to include:

> a review of the programs and activities (including regulatory activities) of the Federal Government, the State and local governments and nongovernmental entities and individuals with particular reference to their effect on the environment and on the conservation, development, and utilization of natural resources (US Congress, 1969. Title II sec. 201)

According to the law, the report should include "a program for remedying deficiencies" (Ibid.)[5] This report as defined by law should be a survey of programmatic data that allows for an evaluation of environmental progress. The Environmental Quality Report has been issued with relative frequency since 1970.[6] Several cities and states have issued reports with similar format and tone since that time.

Evaluative techniques such as energy audits and property liability audits have been in use in the public sector since the seventies. Environmental auditing may encompass the use of these techniques. In an environmental audit, there is a stated goal of environmental improvement. If either an energy audit or a property liability audit is performed with stated environmental improvement goals, then they may also be considered environmental audits. Energy or property liability audits performed before the standardization of the term "environmental audit", might meet today's criteria of an environmental audit.

In the United States, environmental auditing of federal facilities began shortly after the presentation of the EPA environmental auditing policy statement in 1986. In that same year EPA developed a protocol for environmental auditing of EPA facilities. Environmental auditing in other parts of the Federal government is mostly limited to facilities of the Departments of Energy and Defense. The discovery of large-scale pollution problems at nuclear weapons facilities and the large expense of remediation is the driving force behind these audits. Environmental audits of these facilities are now incorporated as part of the clean-up program (Riedel, 1996). Environmental audits in the Federal Government outside of the Department of Energy and the Department of Defense are still rare (US GAO, 1995).

---

[5] Interestingly, the Council on Environmental Quality is supposed to consult with a "Citizens Advisory Committee".

[6] There has not been an Environmental Quality Report annually since NEPA was signed into law by President Nixon. Some years have been missed.

In New York State, Governor Cuomo signed an executive order suggesting that all New York State Departments conduct environmental audits. When the state Department of Environmental Conservation later surveyed the other agencies, it found that none of the other agencies had begun an environmental auditing program. The Governor responded by ordering that every department develop environmental auditing protocols (***BNA Environmental Reporter***, 1994). A recent action by Governor Pataki has rescinded all of Governor Cuomo's executive orders, leaving this effort in limbo.

A 1991 survey of environmental auditing practice in Canada found that only two of nineteen responding public sector departments had an environmental audit program in place. At the same time, fifty-seven out of seventy-five responding private sector firms had environmental auditing program in place. The two positive public sector responses in this survey were from agencies at the Federal level of Canadian government (Thompson and Wilson, 1994). More recent efforts at public sector auditing are arising out of local sustainability efforts arising out of local and regional government participation in the 1992 Earth Summit in Rio De Janeiro (NRTEE, 1993).

Public sector environmental auditing is much more advanced in the United Kingdom, partly due to the wide publicity of the public sector auditing process illustrated in the first case study presented in this chapter. The activism of local government in places such as Lancashire led to an advisory compilation on public sector auditing efforts by the Local Government Management Board in 1991. Local government activists in Britain (as in Canada) were active in the Earth Summit and have formed Local Agenda 21 efforts. These efforts call for public sector auditing as a part of local government sustainability efforts.

The practice of environmental auditing in the public sector is still new. The earliest efforts in the United States are less than a decade old. The concept is now in Britain where significant public sector activity is occurring (Masser and Prtichard, 1994) The two cases studies that follow reflect this early stage of environmental auditing practice in the public sector.

Case One - Lancashire—A Green Audit

Local government in the United Kingdom is divided into Regions and then into Counties. These Counties are composed of Districts that are comprised of cities, suburban regions, and rural areas. The County of Lancashire lies on the Irish Sea, just north of the large cities of Liverpool and Manchester. The County contains several urban centers including the resort town of Blackpool, and the industrial cities of Preston, and Blackburn. Lancashire has an area of 306,951 hectares and a population of 1,390,800.

1. The Context of the Audit

The County of Lancashire conducted one of the first ever public sector environmental audits of a region in the United Kingdom. Previously efforts in the United Kingdom tended to be issue-specific environmental audits dealing with topics such as energy efficiency, and air pollution reduction. A notable forerunner to Lancashire's efforts were several internal audits of local government functions in 1988 in the District of Kirklees. The District conducted these audits as a pilot program with assistance from Friends of the Earth (Ward, 1993). At the same time (1988-1989), the national government was involved in a process of developing a "White Paper" on the environment. This included an effort to address issues raised by the Brundtlund Report (WCED, 1987). A major portion of this work on the national level included an effort to find non-regulatory mechanisms for environmental improvement such as auditing. Members of the County government were aware of these earlier and concurrent efforts, and they influenced the decisions of the County (Taylor, 1991).

The County Government was involved in three environmental efforts prior to the audit. First, there was a problem of sewage discharges in Morecambe Bay, in the northwestern part of the County. Secondly, nuclear power was very controversial in the County. The Heysham nuclear generating station with two units providing over 2,000 megawatts is located in the Lancaster District of Lancashire on Morecambe Bay. The Springfields uranium processing plant is also located in Lancashire. There has been a long standing controversy over radiation leaks from this facility, which is operated by British Nuclear Fuels. Finally, there have been campaigns against the burning of various types of solid and hazardous waste. Each of these issues was being

debated without the benefit of knowing the full context of the controversy, such as the total sewage discharges and how these discharges compared with other areas.

The County Council is the regional legislative body of government. It is a representative body with regional authority. The County Council voted to conduct the Audit in March 1989. Support for this decision came from a variety of sources including environmental groups such as Friends of the Earth (FOE), and the local government District Councils. In the months following approval, the Council appropriated £200,000 for the project and work commenced in October 1989 (Taylor, 1991).

2. Environmental Audit Objectives

There were two main objectives of the audit. First, they wanted an inventory of environmental data on the region. Second, they wanted to review internal County operations was also conducted. The County Council identified six objectives for the inventory:

1. Provide a comprehensive statement of the conditions of the environment by compiling available data and comparing the data against accepted indicators standards and targets.
2. Establish a baseline of information against which future changes and developments in the conditions of Lancashire's environment can be monitored regularly and which will form an extensive database that will be continuously kept up-to-date.
3. Identify shortfalls in information.
4. Provide data that are essential to the task of deciding the action required for sustaining and improving the health and condition of Lancashire's environment.
5. Help the County and District Councils to further develop the process of ensuring that their services are delivered in an environmental friendly manner and to help others achieve improvements in their own operations
6. Act as a focus for enlisting the support and co-operation of the people of Lancashire and all agencies, whether local, regional, or national in caring for and safeguarding the County's environment. (Lancashire County Council, 1991. p. 4)

The audit was seen as a first-step measure toward a long term commitment to regional environmental management. The information in the audit was intended to be used as the basis for future environmental audits, allowing effective evaluation of environmental management activities. Comprehensive identification of environmental conditions in the County were the measurement criteria.

3. How the Audit Was Conducted.

The audit was broken down into two projects. The largest project was the production of a "green audit" of the region. The second project was an audit of the internal activities of the County Council. Both projects are considered here as part of this case. Coordination of both audit projects was done by an "officers management group". This group "links together County Council officers and interfaces with external groups." The County Council Committee on Policy and Resources is represented on this committee along with the County executive and administration representatives from each of the County agencies.

The Green Audit (State of the Environment Report)

The Lancashire Planning Department conducted the green audit. The Planning Office has a director in charge of the environmental unit and a staff of three This environmental unit was created at the same time as the green audit . The audit took eighteen months to complete from planning stages to presentation of the report. The data collection took four months; the rest of the time was spent on analysis, data presentation, and consultation (Taylor, 1991)

Outside experts were used for two functions. First, assistance on the collection and interpretation of environmental data was provided by the Environmental Advisory Unit of Liverpool University. Secondly, geographic information systems analysis of satellite imaging was done by the Geography Department of Salford University. The rest of the work was performed by the planning department.

A consultative group of stakeholders was also set up: The Environmental Forum. Members of this group come from organizations from five sectors: national government and agencies, Lancashire local government, industry, interest groups and academic institutions. Some of the organizations in the Environmental Forum include Friends of the Earth, the Town and Country Planning Association, the National Farmers Union, Nuclear Electric, and the Confederation of British Industry. At the beginning, seventy organizations sent representatives to the Environmental Forum. A smaller Forum Steering Group made up of eighteen key representatives meets regularly to do the work of the larger body. Issues that developed during the preparation of the report were presented to the Forum for comment.

The primary work of the audit consisted of compiling environmental information within a list of ten topical areas: air, water, waste, noise, energy, land and agriculture, wildlife, landscape and townscape, open space, and transport. Background information on the physical structure of the environment was also collected. For each topical area, laws and regulations were identified at each level from Europe-wide standards, United Kingdom laws and to the County and District level. Then the responsibilities of the various levels of governments, agencies, authorities, and utilities were identified. These set the agenda for organizing the compilation of environmental data. Environmental data was compiled from previously accomplished environmental impact assessments, planning documents, and other sources.

Much of the work of the audit came about in how to present the data. The environmental data are presented in tables, charts, and maps as well as in the text. The level of detail depends upon the topic and whether or not data were available. Continuous data on topics such as landscapes are presented in dot diagrams and maps up to a 5 km grid. Most of the data display maps are presented in the same scale. A transparent overlay with cities and towns identified was prepared for use with the report. Care was taken to protect proprietary information relating to specific industrial processes. Thus, little or no information is presented regarding emissions from individual private sector facilities. Instead, data on ambient emission are presented.

A draft report was prepared and circulated to the Environmental Forum for comment. Members of the Forum were given sixty days to prepare comments and changes in the report. The Final Report was presented to the County Council in early 1991 (Taylor, 1991).

The Internal Audit—Better Environmental Practices

The internal audit became the "Better Environmental Practices" initiative. The Officers Management Group discussed what priorities should be first addressed and in June 1990 agreed upon the following definition for the BEPS initiative:

> To review the environmental impact of, and to consider possible future changes to, existing policies and practices of County Council departments and to recommend changes so as to minimize the environmental consequences of service delivery and operations whilst maintaining quality and cost objectives. (Taylor, 1991)

A subcommittee of the Officers' Management Group was established to perform the internal audit. Each County department was represented on this committee. This representative has the responsibility for implementing practices identified by the committee. (Taylor, 1991).

This committee did not immediately conduct a comprehensive internal environmental audit. Instead the committee worked on "instilling the environmental ethic into County operations." It was felt that such an ethic has to be "cultivated" through training efforts and interactions with the overall committee. The committee met and decided to use a Friends of the Earth (FOE) checklist entitled "Charter for Local Government" as a guide for implementing the BEPS definition. This publication listed 200 areas for better governmental environmental practice. County practice was compared to the FOE standard of practice. Areas where improvements were necessary were identified and prioritized. (Taylor, 1991)

4. What Did the Audit Find?

The preliminary results of the green audit were ready in 1990 while the BEPS process had just started. The green audit identified issues to be addressed and prioritized in discussions with the Environmental Forum. The BEPS process produced a list of prioritized activities to be addressed by the County government.

The Green Audit

The green audit report concludes by identifying 150 issues to be addressed. There is no concluding statement to the effect that the region is in good or bad environmental health. Issues one through six are "general" issues. The intention seems to be that each issue has the same weight since issue number six states "how to best prioritize and resource the steps that need to be taken" (p. 315). Apart from asking how to prioritize, the five other general issues include:

- How to use the Environmental Forum to develop and implement an Action Plan.
- How to inform the public about the audit and action plan.
- How to ensure access to the data collected.
- How to use the data to reduce environmental impacts of Council operations.
- The need for wider assistance from the European Community and British government in addressing the environmental problems of Lancashire.

The 144 remaining issue statements are organized by topical areas. Of the topical areas, water quality leads with the most identified issues (20) followed by waste (19) and transport (17).

By examining the phrasing of the issues reported, I have classified the issues into four categories: organizational, compliance, informational, and issues needing more debate. Compliance issues include matters such as air monitoring procedures that do not meet European Community Directives and the failure of bathing beaches to meet bacteriological standards. These are issues where a measurement was found to be in noncompliance with an environmental law, directive, or standard. Twelve of the 150 issues are compliance issues. Organizational issues address matters of administration and implementation. They include items such as "the need for tougher action on those who cause litter" and "the opportunity to promote cycling to work and cycling generally." Almost one third of the issues are organizational (49). Many of the issues (46) were just statements of the need for more data—the informational category. Finally more than twenty issues were just descriptive phrases without any needs or activities suggested. For example, issue number 72 simply states: "Environmental effects and risks associated with Heysham and Padiham power stations." Nothing is said about what to do about these effects or risks or even whether or not there is enough data to judge. The lack of any qualifier or action implies that these are issues for which there needs to be more debate in order to clarify the issue..

The BEPS Process

The BEPS process led to a June 1991 report. Action was deemed necessary in 166 areas of the checklist; immediate action was needed in nearly half of these. Examples of items needing more action included energy conservation planning, departmental recycling, environmental training for all County staff, an environmental assessment policy for "principal road construction schemes", purchasing of diesel powered vehicles, maximal use of reclaimed building materials, increased use of recycled paper, and the extension of public transport. Each Department has also formed "green teams" in order to integrate environmental policies throughout the organization and to develop departmental strategies (Taylor, 1991).

5. What Happened After the Audit?

The green audit was presented to the Environmental Forum and to various public organizations in Lancashire. Forty thousand leaflets describing the green audit were distributed

throughout the County. Each leaflet contained a survey describing the work and asking for opinions on what issues should be prioritized. The Steering Group of the Environmental Forum oversaw this process of tallying the opinions. These opinions as well as those of the Environmental Forum were used to develop working groups on priorities for Environmental Action Program. This program would serve as the implementation plan for the green audit (Taylor, 1991). The Environmental Forum released the Environmental Action Program in 1993 (Taylor, 1993).

The Environmental Forum continues to meet and to work on cooperative implementation of this program. It recently sponsored an attitudinal study on issues of sustainability. The study reached out to groups of people not usually represented in environmental committees and asked about their opinions on sustainability and the environment. This study found a sense of alienation from local government and found significant concern over local environmental issues (Pinfield, 1995).

There was intense interest in the green audit after it was published. A conference was organized by the County in order to answer questions and to respond to information inquiries. Over two hundred people attended the conference (Ward, 1993). Several other County-level reports have followed the Lancashire green audit. These Counties include Essex, Hertfordshire and Northumberland. Smaller Borough governments have also conducted audits including Hove and Clackmannan. The Civic Trust has sponsored an environmental audit of London. One study counted twenty-seven examples of "green audits" (Masser and Pritchard, 1994)

Lancashire's environmental auditing efforts have been recognized by the Local Government Management Board, an association of local government management in the United Kingdom. Efforts are now focused on applying the regional auditing efforts to issues of sustainability. Representatives from local government in Britain were active in the Rio Earth Summit. They are now working on local Agenda 21 plans based upon the Agenda 21 that came out of that conference. Both Lancashire's audit program and the work of the Environmental Forum are used as a case example of how to develop a Local Agenda 21 (Taylor, 1993).

Case Two—An Environmental Audit of the New York City Budget.

New York City is the most populous city in the nation with a population of 7.3 million. Only two other local governments approach this size in the United States—Los Angeles County in California (population of 9.1 million) and Cook County (which includes the City of Chicago) in Illinois (population of 5.1 million).[7] The government of the City of New York is larger than most states. Only California, Texas, Florida, New York State, and Pennsylvania had expenditures in 1993 that were higher than that of the government of New York City.

1. The Context of the Audit

In 1989, then Manhattan Borough President David Dinkins challenged incumbent mayor Ed Koch in the Democratic Party Primary for Mayor. In the primary, Dinkins' campaign relied on a strategy of appealing to progressive activist groups to widen his strong base in the African-American community in Harlem. Environmental groups were a part of this effort and Borough President Dinkins fought hard to get the endorsement of groups such as the League of Conservation Voters and the Sierra Club. As a candidate, Borough President Dinkins made many promises and loose commitments in order to get these endorsements. A similar effort was also made in the general election against Rudolph Giuliani. Thus, Mayor-elect Dinkins had some commitment to environmental issues.

In New York City, a severe fiscal crisis began in 1990 that continues to this day. A strong recession led to higher rates of unemployment and poverty which in turn increased the load on the city's welfare system. Thus, required expenditures began to increase. At the same time, the drop in economic activities led to lower tax revenues from which to meet these new demands on the city. The city began to cut back on what were noted as "non-essential" services in order to save money. Many of these services were environmental in nature such as recycling, and park maintenance.

The Center for the Biology of Natural Systems, as a research institute within the City University of New York, performed several informal environmental analyses for members of the Dinkins administration. The Center performed analyses of ways to both increase the recycling

[7] The split in functions between the city government, county government and state governments in New York, New York; Los Angeles, California; and Chicago, Illinois make direct comparisons hard.

rate while saving money for the Recycling Office of the Department of Sanitation. Then, the question of whether or not savings could be found in other environmental programs was raised by Center staff.

The Director of the Center, Dr. Barry Commoner, had begun writing about the "failure of the environmental effort" in the eighties. According to his thinking, if pollution prevention approaches are taken instead of command and control approaches, it may be possible to both save money and improve the environment (Commoner, 1990). Discussions at CBNS staff meetings led to the application of the theory of pollution prevention to local government applications. What if we audited New York City to find measures (like the measures in the recycling program) that could both improve New York City's environment and save the City money? The Jessie Smith Noyes Foundation and the Surdna Foundation were approached to fund this work in 1991. As a part of the foundation grants, CBNS had to get a commitment from a member of the administration that the audit would be examined. Deputy Mayor Barbara Fife delivered a letter committing the administration to a review of the audit results.

2. Environmental Audit Objectives

The original objective of the audit was simply to identify measures which both improve the environment and save money. Typically, the staff envisioned these savings to be achieved through conservation and recycling efforts. Yet, as work was begun on the project, it became clear that it was very hard to breakdown city expenditures into neat categories that allowed easy calculation of environmental cost savings. A more general question was then added to the scope of the audit. What role does environmental management play within the context of the New York City budget and how have these expenditures contributed to the present financial crisis? This analysis would address the context of the specific cost savings measures to be identified. Thus, the measurement criteria of the evaluation would be in terms of potential dollars saved.

3. How the Audit Was Conducted.

The audit took two approaches. First, the environmental management function within New York city government had to be identified. This function includes the activities of the Departments of Sanitation, Environmental Protection, Transportation, Parks and Recreation, and Consumer Affairs. The Department of General Services was also included as an environmental

function because of its powers over central purchasing of supplies and services. The other functions of the City were divided into four other categories: administration, human services, safety and justice, and education and culture. With these categories defined, the budget history of environmental management could be described. This required the compilation of past New York City budgets. Budgets back to FY 1980 were analyzed.

The second approach was investigative and required interviews of city officials. Deputy Mayor Fife referred Center staff to the Department of General Services in order to get specific information on city policy. As one of the largest governments, New York City is one of the largest single consumers of many types of products and services. The City follows an elaborate specification and competitive bidding process for purchasing. This process is rather rigid. Often savings may be found if specifications are changed to allow for an environmentally-cleaner product. Analysis of the city's purchases was the focus of the second effort.

City employees were not eager to talk to CBNS staff. Even with the approval of both the Deputy Mayor and the Commissioner of the Department of Public Services, CBNS had to perform an additional analysis in order to get cooperation from DPS staff. This analysis, an investigation into the use of recycled antifreeze, was attached to the final report. The investigation proved some degree of competency with purchase specification issues that were important to Department staff. Once this analysis was produced, information on contracts and specifications was more forthcoming from the Department.

Finally, the report was being written in the fall of 1993. When Mayor Dinkins lost the 1993 mayoral election, it became clear that the administrators for whom the report was being written would be leaving city government. CBNS put off releasing the final report until the new administration was in power in February 1994.

4. What Did the Audit Find?

The twin approach to the project yielded two types of results. First, the audit found that the environmental agencies account for a relatively small part of the overall city expense budget -- 13%. However, environmental activities account for the more than 80% of the capital budget. Thus, the development of environmental infrastructure including highways, water supply, and

sewage treatment accounted for more than sixty percent of the City's debt service payments.[8] Thus, the original approach looking at ways to reduce expenses would only provide small relief to city's expense budget. Changes in environmental management would have their largest effect on capital projects and long-term expenditures.

The second part of the project identified savings of between $100 to $200 million in expenses out of an annual budget of $29 billion. The majority of these savings came about from the application of energy conservation measures and water conservation measures in city owned and city controlled buildings. The fact that the city owned or controlled up to 15% of buildings in some neighborhoods led to these large savings numbers.

The Audit concluded that "measures outlined in this report fail to influence directly the most powerful factor that determines the City's fiscal condition—the state of the local economy, which strongly influences tax revenues". The audit went on to note that one environmental activity—recycling—could lead to expanded economic activity in the City. Such increases in economic activity would do the most to improve the city's finances.

5. What Happened After the Audit?

The audit was sent to the supporting foundations in February 1994. The project director of one of the boards of the foundations presented the audit findings to members of the new administration. The audit report was also sent to the offices of the New York City Comptroller and the New York City Public Advocate. However, very little notice of the work has since taken place. Copies of the report were also provided to the Departments of Environmental Protection and General Services.

A Comparison of the Two Cases

The two public sector audits just profiled share some characteristics and contrast sharply in terms of other characteristics. Both audits were first time audits. One of the audits was performed externally and the other was an internal audit. The audits contrast sharply in terms of their implementation plans.

---

[8] The difference in capital budget attributable to environmental agencies and debt service is accounted for by state and federal construction grants for environmental capital improvements.

1. First-Time Audits vs. Follow-Up Audits

The cases described are both first-time audits. Thompson and Wilson found substantial differences between first time audits and post first time audits. First time audits face substantial hurdles. These hurdles include "negative attitudes from facility employees who fear that the audit will be a critique of their performance." Locating relevant documentation may be time and labor intensive. Some description of history is necessary (Thompson and Wilson, 1994, 608). The CBNS audit suffered from all three of these factors of first time audits and especially from the non-actions of employees who felt threatened by the audit In Lancashire, the audit was being conducted internally by the staff who had responsibility for these issues. The Lancashire audit is primarily inventory, documentation of relevant regulations, and history.

2. External vs. Internal Environmental Audit Performance

The two cases presented differ in who performed the audit. In the New York example, outsiders conducted the audit. Employees of the procurement office of the Department of General Services did not want to talk to staffmembers of CBNS. There is a real trade-off here. When an audit is being performed for the first-time, outside help may be needed. Yet, the use of such external assistance in an environmental audit increases the relative unfamiliarity of the adoption of a new process. In Lancashire, the audit was performed internally. This leads to the casting of compliance problems in terms that become vague. For example, statements are made that levels may be noncompliant when they <u>are</u> noncompliance. This hedging matches some practices in the private sector.

How Do These Cases Compare to Private Sector Practice?

How well did these two cases meet the criteria for successful auditing defined in the last Chapter? I shall look at both the characteristics of a successful audit and the characteristics of successful auditing programs.

1. Clearly Defined Goals.

The goals in both case studies were broader and more general than what is typical in private sector practice. In the New York case the goals of the audit effort were expanded to allow for the budgetary analysis. The audit produced estimates of potential environmental

savings, but more detailed analyses of NYC purchases proved impossible to accomplish without more cooperation from the Department of General Services. In the Lancashire example, part of the audit function was to determine their goals. This was done by identifying issues and then surveying the populace about their opinions on environmental issues. The setting up of the Environmental Forum was critical to the job of goal setting. This committee represented diverse interests. The Environmental Forum reached consensus on all but five of the priorities in the Environmental Action Program. That this much consensus could be reached was surprising to some planners who reviewed the outcome of the process (Scudamore and Rudd, 1993).

2. Expertise of Audit Staff

The amount of expertise varied in the cases. In the New York case, the audit staff had political organizing experience in local government and was familiar with the structure of New York City's government. CBNS had a chemical engineer on staff with both private and corporate experience. CBNS had conducted many energy audits for city-owned residential buildings and had produced the baseline study of how to weatherize typical NYC tenements. However, no one on staff had public administration and public finance expertise.

Lancashire put together an environmental unit within their Planning Department for the sake of the audit. This planning unit remains in existence and conducts environmental assessments of County activities following the recommendations of the internal audit. The County relied on outside expertise for data analysis and interpretation for the green audit.

3. Data Consistency and Quality.

Consistent quality data in an environmental audit is a function of well-thought out protocols. In New York City, CBNS had trouble getting data from the City administration. CBNS should have negotiated audit protocols before conducting the analysis. These negotiations might have included members of the staffs of each of the key environmental departments, under the direction of an administrator in the Deputy Mayor's office. Instead, negotiations over data availability (leading to the recycled antifreeze analysis) became part of the audit activities, instead of data collection and analysis.

Data quality and consistency also suffered in the Lancashire example. The green audit put together all of the publicly available data they could find. Many of the issues identified at the end of the document are about improving data quality. The internal audit suffered from the lack of a protocol developed for their own situation. The Lancashire protocol was to take the FOE Checklist and give a prioritized answer as to the extent that they thought the County operations met the issue on the checklist. However, this process does have the advantage of being replicable.

4. Clearly Written Report with Prioritized Findings

The New York case had a final report with a conclusion. By analyzing the context for environmental expenditures, CBNS concluded that raising revenue was more important in the long run then the savings provided by better environmental management. CBNS described possible savings in some environmental management activities. These activities were not prioritized.

The Lancashire green audit identified issues that remained to be addressed. One of the first issues was how to prioritize the rest of the issues. This prioritization was done through the work of the Environmental Forum. The internal audit produced a prioritized list of findings.

5. An Implementation Plan

Neither audit report directly addressed how deficiencies identified would be corrected. In Lancashire, implementation was one of the issues identified. Allowing for public participation took time, especially as the process was new and just being implemented. The County Council relied on the Environmental Forum to develop the Environmental Action Program. While implementation took time, the time was used to build up the commitment to environmental values both within the County government through the Better Environmental Practices program, and through the deliberative process of the Environmental Forum.

The CBNS report relied on the commitments of City officials who were political employees. Implementation plans were to be worked out in a series of consultations with responsible parties in the City government. Thus, when Mayor Dinkins lost his reelection bid, the commitment to implement audit findings was lost. These consultations were never held.

6. Top Management Support for Auditing Program

The two cases differed in terms of organizational commitment to environmental management. In Lancashire, the environmental audit was initiated by the County Council, an elected legislative body. The managers of the County departments regularly report to this body. A departmental unit was set up to do this work and to do whatever work would be required as audit results were implemented. Thus, there was a strong mandate for the work of the environmental audit.

In the New York case, the commitment from the top management was weak and only motivated by political obligations rather than by an underlying belief in environmental values.[9] The top administrators did not initiate the audit, and they only tolerated the work. Without strong support from agency employees at the civil service level, the audit lost its audience after the election. The New York case is like the case cited in the private sector where the environmental audit was performed and the final report was just filed away (Rappaport and Flaherty, 1992).

7. Good Communication Between Audit Staff and Audited Operations

The cases are quite different on this measure. Part of this difference may be due to the previously discussed difference between self auditing and being audited by an outsider. The CBNS case is one of outright suspicion between auditor and audits which resulted in administrative delay. In contrast, Lancashire set up committees that could facilitate communication. Lancashire, the Officers Management Group oversaw the internal audit operations and the production of the green audit. Each of the County departments was represented on this body as well as the County Council and the executive office of the County. In the production of the green audit, the Environmental Forum was used as a forum to get feedback from entities whose environmental effects show up in the data.

[9] In fact, environmentalists were viewed with some suspicion by many loyal members of the Dinkins' administration. It was rumored that mailings from the environmental mailing lists had generated an inordinate amount of racially charged hate mail during the first election.

8. Commitment to Auditing Process from the Operational Level

There was little or no commitment to the auditing process from the operational level in the New York City report. Staff of the Department of General Services were polite but not forthcoming to CBNS inquiries. These Departmental staff had nothing to gain from the CBNS process. Incorporating environmental values into City purchasing was seen as extravagant by some staff. Little time or energy was spent by CBNS employees on translating environmental values to the job at hand.

In Lancashire, one of the major goals of the internal audit was to increase the commitment to environmental management throughout the County department and agencies. The representatives to the Officers Management Group were required to develop individual departmental program to implement environmental goals. Each department formed a green team to address their own environmental issues (Taylor, 1993).

9. The Degree of Independence of the Auditing Function

The amount of independence also varied in these two cases. In the New York case, the auditors were mostly independent of New York City operations. In the Lancashire case, the audits were done in-house. The development of the Environmental Action Program was done by the Environmental Forum, a body with representation of the Lancashire County Council.

If Lancashire wants to get certification under the European Eco-management and Auditing Scheme or ISO 14000, the County would need to have its audit procedures verified. This would entail the hiring of an environmental auditing firm that would verify whether or not the environmental management practices were in good order. The Borough of Sutton has received certification under EMAS (Woolard, 1996). Such an audit of Lancashire might lead to improvements in their internal audit structure and protocols.

Conclusion

The contrast between the two cases is great. In many ways, the New York City effort is a failure. No implementation plan was ever acted on. Organizational commitment to environmental management did not increase after the audit was released. Environmental management is not an issue for top management of New York City at the present time.

The Lancashire audits seem very successful. Two aspects of this case stand out. First, the commitment to increasing the environmental awareness of the county employees is impressive. It has a slight parallel to the Raytheon example of getting an environmental auditing advocate at each site. Secondly, the role of the Environmental Forum is also impressive. Now that the Environmental Action Program has been produced, it will be interesting to see if and how the various measures are implemented.

Chapter 5: Planning for Successful Public Sector Environmental Auditing Practice

This chapter examines issues related to planning for successful environmental auditing practice at the local municipal level. The first section compares motives for auditing in the private sector to the motives in the public sector. The differing motives for public sector environmental audits leads to some considerations on which audits ought to be performed. Lastly, I recommend ways to initiate environmental auditing programs in local government.

The Motivation for Auditing

Why do organizations do environmental auditing? In the private sector, auditing is driven by many factors including compliance, liability reduction, environmental public relations and cost reduction. In this section, I examine the reasons to conduct audits emphasizing those reasons that will be most convincing to top management of cities and towns — public officials.

Environmental Compliance and Enforcement

Many companies began environmental auditing as a way to increase compliance with environmental health and safety laws. The pressure to comply began with the passage of environmental laws in the late 60's and 70's and the development of enforcement measures for these laws. Enforcement of these laws has proven to be complex. Enforcement requires some system of inspection and reporting combined with a system of penalties for non-compliance. DiMento (1986) identifies three formal types of enforcement measures: criminal sanctions, civil sanctions, and administrative orders.

Criminal sanctions are detailed in the penalties included in environmental laws. For example, the Clean Water Act makes it a crime to pollute navigable waters. The penalties for this crime, including imprisonment and fines, vary with the degree of seriousness of the pollution incident (Locke, 1991). Other criminal laws, such as racketeering statutes, may be applied to environmental cases. Criminal enforcement actions began in earnest in 1978 when Attorney General James Moorman announced that prosecutions of environmental law violations would soon begin and that grand juries were currently in session (Cooney, et. al 1995a). With the "responsible corporate officer doctrine" (described in Chapter 2), top management in the private

sector has an incentive both to avoid non-compliance and to use environmental auditing as a way to prove due diligence in correcting instances of non-compliance (Hartman and De Monaco, 1993).

Public officials are protected from criminal sanctions. Criminal sanctions for violations of environmental laws under their tenure of environmental management of a locality are not allowable. Public officials enjoy a broad degree of legislative immunity from criminal acts committed in the fulfillment of their public jobs (Smith, 1991). Without this immunity, few people might engage in public service and risk prosecution. Thus, the threat of criminal prosecution under the responsible corporate officer doctrine does not provide a motive to increase auditing in cities and towns.

Civil sanctions are based upon concepts of nuisance or civil statutes. Civil actions may include fines and injunctions. Critics of civil sanctions complain that civil actions do not communicate the seriousness of an environmental transgression. Fines and injunctions may be answered within an organization with no organizational change to address how the transgression occurred (DiMento, 1986). These criticisms may be true for both the private and public sector.

Administrative orders are the third type of enforcement measures (DiMento, 1986). Administrative orders are conditions imposed directly upon a business such as the suspension of an environmental permit because of an environmental violation. Administrative orders, such as consent decrees, are a primary means of enforcing environmental laws in the public sector. They suffer from the same deficiencies in changing organizational behavior that occur with civil sanctions.

My findings on compliance as a motivation for environmental audits show that fear of criminal sanctions motivates many private sector companies to do environmental auditing. Yet, other forms of enforcement are less successful. Since officials in the public sector do not face criminal sanctions, increased compliance is a weak motivation for auditing in cites and regions.

Liability

One of the major motivations of environmental auditing in the private sector is the reduction of liability under Superfund. Ownership of property may lead to assignment of liability

under this law. Companies perform audits of property before they acquire parcels in order to assess these liabilities. Cities and regions do not face liability for Superfund on land they acquire through eminent domain or through involuntary means including escheat (Kolker and Dowden, 1995). Cities and regions face liabilities for existing hazards on land owned by the local municipality; sites such as closed municipal landfills are listed as Superfund sites. The pressure to audit to reduce liabilities is less strong for cities and regions than for the private sector.

Cost Reduction

Cost reduction may or may not motivate environmental auditing in the private sector. Market forces may lead to more efficient operation and management in the private sector. These competitive pressures may lead to significant efforts to cut down on unnecessary costs. For some companies, cost reduction is both an implied and an explicit motivation for auditing. Companies hope that they are avoiding the expense of legal and criminal sanctions by finding and correcting areas of noncompliance before an enforcement action is taken. Neither Polaroid nor Raytheon had estimated the cost savings due to environmental auditing in their company (Marino, 1996; Borghesani, 1996). The reduction of these costs is implied since companies can not measure what the costs of compliance might have been. Environmental audits conducted to identify pollution prevention and/or energy conservation measures use a built-in cost effectiveness function. Measures are chosen in such audits based upon their cost-effectiveness over the lifetime of the measure. Finally, many companies conduct audits to protect top management from criminal prosecution. In these cases, auditing does not have to save money: it is an expense of doing business. Cost reduction may motivate some private sector audits, but other auditing programs are seen as a necessary expense.

Public sector cost reduction is subject to different forces. The public sector is characterized as wasteful and capable of more efficient operation. Many public operations are shielded from market forces (Savas, 1987). As described in Chapter 1, cities and regions face fiscally difficult times as expenses rise and available revenues drop. Local governments build, operate, and maintain large amounts of environmental infrastructure. These infrastructure costs lead to large amounts of environmental capital expense in local budgets. In the audit of the New York City budget, environmental management functions accounted for 80% of the City's capital

budget (Frisch and Commoner, 1994). Finally, cities and regions do not have the same criminal enforcement pressures that private sector organizations have. Thus, any environmental auditing program must be cost-effective. Thus, cost reduction is both a stronger motivation for and a more necessary component of public sector environmental auditing programs.

Environmental Auditing for Improved Public Relations

Many companies use environmental audits to identify positive efforts toward environmental improvement within the company. Polaroid started its comprehensive auditing program after being the target of environmental enforcement. In the future, audits will be used to prove that company operations are managed in accordance with generally accepted environmental standards such as ISO 14000 and EMAS (see Chapter II). When this information is deemed necessary in the market, this motivation for auditing will increase.

Given this potential of environmental auditing to identify positive steps toward environmental improvement, why is there so little environmental auditing in the public sector? Part of the answer may be that evaluations are always political (Patton, 1987). Public-sector administration may be highly politicized. The negative results of an environmental audit cannot be kept confidentially in the public sector to the same extent that it can be in the private sector. In the minds of public officials, the threat of negative results may outweigh any potential for positive gain. The amount of trust necessary for top administrators to initiate an evaluation process may not exist in public organizations.

Both the United Kingdom and Canada appear to have more public sector environmental auditing activity.[10] This activity may originate from the local Agenda 21 efforts. Local governments from both of these countries sent delegations to the Earth Summit in Rio and came back energized to examine what local sustainable development meant in their own communities. According to DiBerto, sustainability is a motivation for auditing outside of the United States (DiBerto, 1996). Some of the cross-national difference may be due the lack of participation on the part of the United States in the Earth Summit.

[10] for example, Canada has the National Roundtable on the Environment and the Economy; in Britain ,the Local Government Management Association has examinedthe meaningi of sustainability to local governments.

The effectiveness of generating positive stories of public sector environmental practice varies by location. Citizens in some places view environmental management as a priority for everyone, including local government. Others see the environment as an elitist issue. Many people still assume that environmental improvement will require yet more expense as it did under the regime of the "command and control" approach to environmental management. Environmental audits conducted with the same purpose of the New York City audit may be done to show that environmental improvement does not always lead to increased cost. Public sector environmental auditing needs to overcome this perception.

The potential exists for cities and regions to use environmental audits in a manner similar to private companies. Cities could publicize the positive achievements in environmental improvement as a measure to increase the attractiveness of the community. Some companies, after receiving negative press about their environmental activities, seem to be motivated to use environmental audits in this manner. Cities and regions also face negative press. Many inner cities are perceived as being dirty and contaminated; audits could be used to change this perception.

Audits in the Context of Total Quality Management

Environmental auditing is an evaluative technique of environmental management. The trend toward "entrepreneurial government" and "total quality management" in government may lead to more environmental auditing. Osborne and Gaebler call for "mission-oriented government" and for qualitative and quantitative measurement of the results (Osborne and Gaebler, 1992) An environmental auditing program would require setting goals and adopting local government environmental policies. In total quality management, continuous improvement is stressed (Cohen and Brand, 1993). The measurement of improvement in terms of environmental success could be achieved through environmental auditing.

Environmental audits may start with an objective, such as compliance with a specific organizational environmental policy. Then auditors check to see if operations meet the objective. They collect quantitative and qualitative data in order to provide an opinion about which operations are in compliance. They go on to suggest improvements in operational procedures to

correct identified compliance problems. These procedures are those necessary to conduct what Patton calls a formative evaluation. According to Patton:

> Formative evaluation serves the purpose of improving a specific program, policy, group of staff, or product. Formative evaluations aim at 'forming' the thing being studied. Formative evaluators want to help to improve human endeavors. ... The purpose of the research is to improve effectiveness within that setting. (Patton, 1990, p. 146)

Environmental audits reports also fit the reporting style of formative evaluations. Patton identifies publication modes of formative evaluations which include: oral briefings, conferences, and internal reports with limited circulation (Ibid., p. 161). Audit reports may take all of these forms (Savitz, 1996).

Formative evaluations aim to improve program performance. Improved performance implies either a reduction in total costs or the production of more goods and services for the same cost. Improved efficiency and cost reduction are the primary motivations for environmental auditing in the public sector.

Summary of Motivations

This preceding section examined the motivation for auditing in the public sector. Cost reduction was found to be the primary motivation for auditing in the public sector. Cost reduction includes reduction of current expenses, reduced capital expense, and improved efficiency found via the adoption of total quality management techniques. Generating positive publicity has some potential to motivate auditing, but there is a common incorrect assumption that environmental improvement leads to increased expenditures. This assumption must be challenged. Cities and regions face some compliance and liability pressure. But these pressures are lighter than those faced in the private sector. Compliance and liability pressures are monetary in the public sector. Thus, whatever pressure municipalities feel in this area also relates to cost reduction.

Choosing Which Evaluation When?

If city management is initiating an environmental auditing program, it makes sense to start with a limited cost-reduction approach. The process of auditing requires the setting of goals, and

the development of protocols that produce data. As the amount of auditing increases, staff in various operations become more familiar with environmental management priorities (Borghesani, 1996). The process itself of doing the evaluation often leads to program improvement.

Evaluation has goals that will conflict with administration. According to Palumbo, evaluators try to do three things concurrently. They help administrators understand what is going on. They themselves try to figure out the whole picture of what is occurring including negative aspects. They try to improve evaluative and administrative practices (Palumbo, 1987). This creates tension between evaluators and administrators. Trust must occur for evaluation to be successful. Wildavsky comments "acceptance of evaluation requires a community of shared values" (Wildavsky, 1979). Trust may be built through shared experience.

Trust can only be built up over time. In the New York city example, trust had to be generated by performing "free" work by CBNS for the Department. In the Raytheon case, trust is created by making local site management part of the auditing process (Marino , 1996). Administrators developing environmental management policies will consider formative evaluations "more friendly." Such evaluations provide information useful to the implementation process (Bryson and Crosby, 1992). **Thus, when cities and regions start their own environmental auditing programs, they need to start slow to allow trust to be built.**

As auditing programs gain experience and begin to tackle proactive issues of environmental management, more trust will be necessary. Addressing issues of noncompliance in public sector management will require an open process with a large degree of community commitment to environmental improvement. Otherwise there is no reason for a public official to risk raising the issue.

Recommendations for Initiating Environmental Auditing Programs in Cities and Regions

I make nine recommendations for initiating environmental auditing practice at the level of city and regional government. These recommendations are based upon the analysis of the previous two chapters. I hope that these measures would lead to the development of

environmental auditing programs in the public sector that replicate benefits found from the practice in the private sector.

Recommendation One—Start Small—Plan to Audit

When an environmental auditing program is initiated, there is a temptation to inventory all of the data necessary for the development of a good baseline. This leads to the "first audit" problem addressed in the last chapter. Much of the comprehensive data necessary could be compiled as part of an environmental planning process. The development of an environmental inventory, survey, or plan would provide the baseline for later audits. Information from past environmental assessments and environmental impact statements could be compiled into such a plan. Audits could then be used to verify specific categories of information within such a plan. The results of the audits should inform the overall planning process and the results of the planning process should inform the development of audit goals and audit protocols.

Instead of auditing an entire city, a new program should pick a particular media, function, department, or site to be audited. In New York City, this might entail an audit of the Department of General Services, or an audit of an office building. By starting small, environmental auditors can gain experience and test protocols for effectiveness.[11] Environmental audits will not solve local government budgetary problems. Weiss's admonition to put the goals of evaluation in "sensible perspective" is important (Weiss, 1973). An initial small auditing program has the advantage of having more clearly defined goals, and has a higher chance of producing useable results.

Recommendation Two—Clear Goals

Consider cost reduction as the initial goal. As efforts proceed, the implication that environmental improvement necessitates increased costs will be challenged. After the municipality has some practical experience, broader non-economic environmental goals could be brought into the program. This depends upon the extent that environmental values have been articulated publicly as important goals for city and regional management. Once these future

[11] An effective protocol leads to collection of qualitative and quantitative data in a way that is replicable.

policies have been developed, auditing can be used to evaluate the extent of operational compliance with these more environmental policies.

Recommendation Three - Staffing

Staffing a new municipal program may be hard. There are existing municipal employees with expertise in the assessment of environmental, health, and safety issues at particular sites. Tap into these positions. Promote these people while expanding their job assignment to this broader function.

Initially, cities and regions could audit each other (Borghesani, 1996). This sort of process would bring in people who are experienced with the day-to-day operation of these functions but who are independent of the particular site being audited. Such an exchange would increase communication and allow for increased cooperation between municipalities.

Outside consultants could be brought in to train new auditing staff or to oversee the development of protocols. As it is important to build up organizational commitment to auditing, thus, the entire audit should not be contracted out. Municipalities should address the degree of independence the think is necessary for their locality.

Recommendation Four—Protocols

Protocols are necessary in order to create data sets that allow for veracity of audit findings and replication of audit work. These can be based upon EPA guidance documents for the auditing of federal facilities (US EPA, 1995) or purchased from the private sector providers such as Arthur D. Little (DiBerto, 1996). Following well-made protocols will assist in insulating the audit from the highly politicized environment of public sector management.

Recommendation Five—Clearly Written Audit Reports

Audit findings should be presented in an audit report. It is harder to hide things in the public sector than in the private sector, so careful attention should be paid to what is said in the report. Given the tightness of public sector budgets, it is even more important that findings be prioritized as to their importance. Two important considerations: 1. Which findings need immediate attention? and 2. What findings show operations that cost more than their remediation? These two considerations would be of immediate import to local officials.

In the audit report it is important to provide balance. What are the successes of the present management system? These must be addressed along with the exceptions to good environmental practice.

Recommendation Six—Implementation Plan

The identification of failures without a remediation plan would be risky and politically unwise. A successful implementation plan would provide a concrete example of government taking positive action for the environment. Top management in cities and are politically motivated and this sort of information may be politically potent. Identification of exceptions in an environmental audit that go uncorrected is evidence of a non-productive administration.

Recommendation Seven—Top Management Support.

Initiating an auditing program will entail taking some risks. These risks include uncovering compliance problems, recognizing liabilities, and finding cases of mismanagement. Management must be committed to remediating any problem that is found. Remediation may take funds that are not readily available in the budget or that require a commitment of capital funds over a period of years. Top city and regional management should be knowledgeable about the risks before starting an audit program.

In the case of a City such as New York, an environmental auditing program should have the support of the Mayor. As chief executive of the city, the Mayor appoints top agency officials who oversee operational aspects of city administration. A bill authorizing the program and committing the City to an environmental management policy should be brought to the City Council. The Council has some oversight over budget matters, and some level of their support is necessary in order to fund any necessary remediation projects. The Comptroller of the City presently has auditing power over City operations, but these audits tend to be hostile. The Comptroller's Office might audit the auditing program for consistency and to ensure that findings are addressed in some manner.

I used a very loose definition of environmental auditing in this report. Cities and regions need to be able to define what their environmental audit is and what they expect to come from it. Lancashire's green audit is more a compilation of environmental data with parallels to the CEQ

Environmental Quality reports. It remains to be seen whether or not their follow-up reports take more of the form of environmental audits in the private sector. Top administration needs should determine the definition of environmental auditing used by an individual in cities or region.

Recommendation Eight—Communication

Communication should be maintained between the top management and the level of operation being audited. The reasons behind the audit should be expressed. Some vehicle for adding input into auditing functions from the level of operation being audited is necessary. An audit oversight committee made up of stakeholders in the evaluative process might be set up as a forum for such input. Stakeholders might include the municipal union, departmental management, executive management and the director of auditing staff.

An external group of stakeholders could also be set up parallel to the Lancashire Environmental Forum. New York City already has issue specific environmental planning advisory bodies. One could be set up to assist in Citywide environmental planning and management. Oversight of the City's internal environmental auditing process would be only one function of such a body.

Recommendation Nine—Gain Commitment to the Auditing Process at the Operational (Line) Level.

This is probably the hardest recommendation to implement. This requires outreach to the workers within the city or region. The connection between the environmental impact of city activities and workers' lives must be made. This connection is most apparent in the health and safety concerns of City workers.

Areas for Further Research

This work raises several other questions. First, are the public and private sectors similar enough that the benefits of environmental auditing found in the private sector would actually accumulate to the public sector? This has been assumed in this work. More work could also be done on analyzing the benefits of environmental auditing to both sectors. Most descriptions of the benefits of environmental auditing seem to reference the list of benefits produced in the first EPA policy on environmental auditing.

I think the role of evaluation in government and planning is still an open question. The field of policy research is full of evaluations of ineffective programs that continue to operate. How good are our new plans, if they are not backed up by evaluations of the few plans that actually get implemented?

Increased public sector environmental auditing might be used to test out the premises of the audit privilege argument within an open context. Do environmental audits need to be confidential in order to be useful? Could audits be accomplished in a very open way? Explicitly open environmental audits may be raise too many instances of non-compliance. If these incidents of non-compliance become well known, they might lower people's trust in public administration. However, I think it may work the other way. Open acknowledgment of problems is the first step to correcting them. The post-audit implementation plan might increase public trust.

Finally, how internalized are environmental values in public management? I have assumed that as companies develop policies and evaluate their performance these values are somehow transmitted to employees throughout the organization including "line" employees. I'm not sure if I can successfully justify this assumption and I don't know how the assumption might change when applied to the administration of a city or a region. It was a major priority of the Lancashire internal auditing effort. It would be interesting to assess their success.

Conclusions

I have shown that environmental auditing is a recognized discipline in the private sector. The practice of environmental auditing is becoming more defined and specialized. The public sector is just beginning to apply environmental auditing techniques. Cities and regions may be able to benefit from the application of auditing techniques that are successful in the private sector. Until the practice is more established, cities and regions should start small and build up the trust necessary to make evaluations such as audits work. Consultative bodies of stakeholders may improve communication and provide significant oversight in the public sector. Since compliance is a weak motivation for public sector audits, cities and regions should start with an emphasis on cost-reduction.

References

Banff Centre for Continuing Education, 1990. ***Environmental Auditing The Challenge of the 1990s.*** (Calgary Albt.: University of Calgary Press, The Banff Centre for Continuing Education)

Barritt, E. 1992. "Towards a Strategic Approach to Environmental Planning." ***Town and Country Planning*** V. 63. N 1. January. p. 14-16.

Bell, CL. 1995. "ISO 14001: Application of International Environmental Management Systems Standards in the United States." ***Environmental Law Reporter***. V. 25. December. p. 10678-10685.

Blumenfeld, M. 1989. ***Conducting An Environmental Audit*** (New York, NY: Executive Enterprises) .111p.

Bryson, JM; Crosby, BC. 1992. ***Leadership for the Common Good.*** (San Francisco, CA: Jossey-Bass Inc.)

Budzik, BT. "Environmental Auditing: A Management Practice." ***Environmental Auditing The Challenge of the 1990s.*** (Calgary Albt.: University of Calgary Press, The Banff Centre for Continuing Education) pp. 27-32

Butler, J. "Environmental Audits: A Corporate Necessity" ***Environmental Auditing The Challenge of the 1990s.*** (Calgary Al.: University of Calgary Press, The Banff Centre for Continuing Education) pp. 7-12.

Cahill, LB. 1993. "Evaluating Management Systems as Part of Environmental Audits" ***Total Quality Environmental Management Journal*** 2, no. 2. (Winter 1992-93) pp. 174-76.

Cairncross, F 1991. ***Costing the Earth***. (Cambridge, MA: Harvard University Press).

Canadian Institute of Chartered Accountants, 1992. ***Environmental Auditing and the Role of the Accounting Profession***. (Toronto ONT.: Canadian Institute of Chartered Accountants).151p.

Chollak, D. 1990. "Environmental Auditing Standards and Activities" ***Environmental Auditing The Challenge of the 1990s.*** (Calgary Albt.: University of Calgary Press, The Banff Centre for Continuing Education) pp. 55-62. Canadian Occidental Petroleum, Ltd.

Cohen, S; Brand, R. 1993. ***Total Quality Management in Government.*** (San Francisco, CA: Jossey-Bass Publishers)

Cooney, JF; Starr; JW; Block, JG; Kelly, TJ Jr. 1995. "Criminal Enforcement of Environmental Laws" ***Environmental Law Review*** (printed in three parts). Part I: p. 10459-10477; Part II: p. 10525-10537 and Part III: p. 10601-10630.

Cowell, EB. 1989 "Environmental Auditing in the BP Group" in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

DiMento, JF. 1986. ***Environmental Law and American Business: Dilemmas of Compliance*** (New York, NY: Plenum Press).

Ditz, D; Ranganathan, J; Banks, RD. 1995. ***Green Ledgers.*** (Washington DC: World Resources Institute).

Duffy, DP; Potter, JE. 1992. "Environmental Auditing" ***Environmental Science and Technology***, n. 9. pp. 1706-08.

Environment Canada, 1988. "Measures to Promote Compliance: Promotion of Environmental Audits" extracted from ***Enforcement and Compliance Policy-Canadian Environmental Protection Act.*** (Ottawa, ON: Environment Canada).

Frisch, M. 1994. "An Analysis of the CGLG Joint Procurement of Recycled Paper" paper produced for the council of Great Lakes Governors, February, 1994.

Frisch, M; Commoner, B. 1994. ***An Environmental Audit of the New York City Budget.*** (Flushing, NY: CBNS, Queens College).

Gardner, JE. 1989. "Decision Making for Sustainable Development: Selected Approaches to Environmental Assessment and Management." ***Environmental Impact Assessment Review***. V. 9, p. 337-366.

Gelfand, A. 1995. ***The CERES Principles: Does Adopting a Voluntary Code of Management Produce Corporate Responsibility?*** (Cambridge, MA: MIT, MCP Thesis in the Department of Urban Studies and Planning)

Gottlieb, R 1995. (ed.) ***Reducing Toxics: A New Approach to Policy and Industrial Decisionmaking***. (Washington, DC: Island Press).

Graham-Bryce, IJ. 1989. "The Approach to Environmental Auditing in the Royal Dutch/Shell Group of Companies" in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

Greeno, JL; Hedstrom, GS; DiBerto, M. 1987. ***Environmental Auditing: Fundamentals and Techniques*** (Cambridge, MA: Center for Environmental Assurance, ADL). 1985 edition also referenced.

Hall, P. 1988. ***Cities of Tomorrow***. (Cambridge, MA: Blackwell Publishers).

Hall, RM Jr.; Tockman, KA. 1995. "International Corporate Environmental Compliance and Auditing Programs." ***Environmental Law Review***. V. 25, N. 8. August. p. 10395-10407.

Hartman, BM; DeMonaco, CA. 1993. "The Present Use of the Responsible Corporate Officer Doctrine in the Criminal Enforcement of Environmental Laws." ***Environmental Law Reporter***. v. 23. March. p. 1014510153.

Hoffman, S. 1989. ***Planning, Staffing and Contracting for an Environmental Audit***. (New York, NY: Executive Enterprises Publications Co. Inc.)

Holliday, GH, 1990. "How to Prevent Criminal Prosecution of Senior Management" ***Environmental Auditing The Challenge of the 1990s***. (Calgary Albt.: University of Calgary Press, The Banff Centre for Continuing Education) 185-191

Hunt, D; Johnson, C. 1993. "The Systems Approach to Corporate Environmental Management and Environmental Auditing." ***Business Strategy and the Environment***. V. 2 N. 1. p. 37.

ICC, 1986. ***ICC Position Paper on Environmental Auditing.*** as reprinted in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

ICC, 1991. Business Charter for Sustainable Development.

ICI, 1994. ***Environmental Performance 1993***. (London, UK: ICI).

ISO, 1995. ***ISO 14000 Standards for Environmental Management*** (Geneva, Switzerland: International Standards Organization).

Jain, RK. 1980. "Environmental Legislation and Regulations" in RA. Corbitt (ed) ***Standard Handbook of Environmental Engineering*** (New York, NY: McGraw-Hill, Inc.)

Johnson, HD. 1995. ***Green Plans: Greenprint for Sustainability***. (Lincoln, NE: University of Nebraska Press).

Kent, TD. 1989. "Risk of 'Smoking Gun' Papers is Outweighed by the Benefits" in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

Kinworthy, MML. 1989. "Environmental Auditing, Unocal Corporation." in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

Kolker, D; Dowden, LG, 1995. "Superfund." in Dowden, L and McNurney, J (eds.) ***Municipal Environmental Compliance Manual.*** (Boca Raton , FL: CRC Press Inc.) p. 5-17.

Lancashire County Council, 1991. ***Lancashire: A Green Audit*** (Preston, UK: Lancashire County Council) 328p.

Ledgerwood, G; Street, E; and Therivel, R. ***Implementing An Environmental Audit*** (Burr Ridge, IL: Irwin Professional Publishing) 212p.

Lenox, M; Ehrenfeld, JR. 1995. "Design for Environment: A New Framework for Strategic Decisions." ***Total Quality Environmental Management***. Summer. p. 37-51.

Locke, RC. 1991. "Environmental Crimes: The Absence of 'Intent' and the Complexities of Compliance." ***Columbia Journal of Environmental Law.*** Vol. 16, N. 1. p. 311-331.

Maclaren, VW. 1996. "Urban Sustainability Reporting." ***APA Journal***. V. 62. N. 2. Spring. p. 184-202.

Marzula, RJ; Kappel, BG. 1991. "Environmental Criminal Liability in the 1990s." ***Columbia Journal of Environmental Law.*** v. 16. p. 201-225.

Masser, I. and Pritchard, A. 1994. "GIS in State of the Environment Auditing." ***Town Planning Review***. V. 65. N 2. p. 205-213.

Morphet, J. 1992. "Gearing Up for the Eco-Audit." ***Town and Country Planning***. Vol. 61. No. 2. February. p. 35-36.

Morphet, J. 1994. "A Local Approach to Environmental Awareness." ***Town and Country Planning***. V. 63, N 2. February. p. 50-51.

Nash, J. Nutt, K. Maxwell, J; Ehrenfeld, J. 1992. "Polaroid's Environmental Accounting and Reporting System: Benefits and Limitations of a TQEM Measurement Tool." ***Total Quality Environmental Management***. Autumn. pp. 3-15.

National Roundtable on the Environment and the Economy (NRTEE). 1993. ***National Roundtable Review***. (Ottawa, ONT: NRTEE) Fall Newsletter.

NYC Office of the Mayor, 1991. ***Mayor's Management Report***. (New York, NY: Office of the Mayor).

Osborne, D; Gaebler, T. 1993. ***Reinventing Government*** (New York, NY: Plume Books).

Palumbo, DJ. 1987. (ed.) ***The Politics of Program Evaluation***. (Newbury Park, CA: Sage Publications Inc.).

Patton, MQ. 1990. ***Qualitative Evaluation and Research Methods 2nd. Ed***. (Newbury Park, CA: Sage Publications, Inc)

Pelletier, C. "Environmental Audits: A Practical Perspective" ***Environmental Auditing The Challenge of the 1990s***. (Calgary Albt.: University of Calgary Press, The Banff Centre for Continuing Education) pp. 69-77. Chief of the National Capital Commission

Pinfield, G. 1995. "Indicators, Institutions and Public Perceptions" ***Town and Country Planning***. Vol. 64, No. 4. April. p. 117-119.

Plaut, J. 1989. "Allied Signal Inc. Health, Safety and Environmental Surveillance Programme." in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

Price Waterhouse, LLP. 1994. ***Progress on the Environmental Challenge***. (Boston, MA: Price Waterhouse, LLP).

Rapetto, R. 1992. "Accounting for Environmental Assets" ***Scientific American***, June pp. 94-100.

Rappaport, A; Flaherty, MF. 1992. ***Corporate Responses to Environmental Challenges.*** (New York, NY: Quorum Books).

Reed, JW. 1990. "Environmental Auditing: Canadian Industry Perspectives" ***Environmental Auditing The Challenge of the 1990s***. (Calgary Albt.: university of Calgary Press, The Banff Centre for Continuing Education) pp. 33-45. Mc Coll Frontenac Inc.

Sagoff, M. 1988. ***The Economy of the Earth***. (New York, NY: Cambridge University Press).

Savage, DE; White, AL. 1995. "New Applications of Total Cost Assessment." ***Pollution Prevention Review***. Winter. p. 7-15.

Savas, ES. 1987. ***Privatization: The Key to Effective Government***. (Chatham, NJ: Chatham House).

Scudamore, D; Rudd, F. 1993. ***Town Planning Review*** V. 64, N. 4. October. p. 461-462. Review of Lancashire County Council, 1991. ***Lancashire: A Green Audit*** and Lancashire County Council/Lancashire Environmental Forum, 1993. ***Lancashire Environmental Action Programme: A Local Agenda 21***.

Smart, B. 1992. (ed.) ***Beyond Compliance: A New Industry View of the Environment.*** (Washington, DC: World Resources Institute).

Smith, SL, 1991. "Shields for the King's Men: Official Immunity and Other Obstacles to Effective Prosecution of Federal Officials For Environmental Crimes." ***Columbia Journal of Environmental Law***. V. 16, N. 1. p. 1-72.

Taylor, D. 1991. "Auditing in the Public Sector. Case Study: The Lancashire Experience." Presented to the IWEM Environmental Auditing Symposium. Nottingham, United Kingdom. November 27.14p.

Taylor, D. 1993. "Working With the Local Community to Produce a Local Agenda 21 Programme for a Sustainable Environment: the Lancashire Model." presented to the Fifth Anniversary Conference on Corporate Responsibility for the Environment and Community; Science and Corporate Responsibility/Ethics: A Way Forward on Environmental Protection, sponsored by the Center for Business and public Sector Ethics, Cambridge, UK. March 3-4.

Thompson, D; Wilson, MJ. 1994. "Environmental Auditing: Theory and Applications" ***Environmental Management***, v. 18, n4. pp. 605-615

United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

US Bureau of the Census, 1995. ***Statistical Abstract of the United States.*** (Washington, DC: US Government Printing Office).

US Department of Justice (DOJ). 1991. ***Factors in Decisions on Criminal Prosecutions for Environmental Violations in the context of Significant Voluntary Compliance or Disclosure Efforts by the Violator***. (Washington, DC: Department of Justice).

US EPA, 1986 ***Environmental Auditing Policy Statement***. 51 Fed. Reg. 250004, 25009 (July 9, 1986.

US EPA, 1992 . ***Total Cost Assessment: Accelerating Industrial Pollution Prevention through Innovative Project Financial Analysis*** (EPA/741/R-92/002)

US EPA, 1995 ***Environmental Auditing Protocol for Federal Facilities***. (Springfield, VA: NTIS).

US Federal Register, 1995. "Incentives for Self Policing: Discovery, Disclosure, Correction and Prevention of Violations" V. 60, N 246. p. 66706- 66712. EPA Notice

US Federal Register, Vol. 51, No. 131, Wednesday, 9 July 1986, 25004

Ward, S. 1993. "Thinking Global, Acting Local? British Local Authorities and Their Environmental Plans" ***Environmental Politics***, V2, N3. Autumn. pp. 453-478.

Weisenbeck, TL; Casvechia, RM. 1992. "Guidelines for Prosecution of Environmental Violations: the tension Between Self-Reporting and Self-Auditing." ***BNA Environmental Reporter.*** March 6. p. 2481-2485.

Weiss, CH. 1973. "Where Politics and Evaluation Research Meet." reprinted in Palumbo, DJ. 1987. (ed.) ***The Politics of Program Evaluation***. (Newbury Park, CA: Sage Publications Inc.).

Wiladavsky, A. 1979. ***Speaking Truth to Power: The Art and Craft of Policy Analysis***. (New Brunswick, NJ: Transaction Publishers)

Wilson, JQ; Rachel, P. 1977. "Can the Government Regulate Itself?" ***The Public Interest*** No. 46. Winter. pp. 3-14.

Wooley, LA. 1989. "Centralized Auditing in a Decentralized Corporation, ITT Corporation." in United Nations Environment Program, 1989. ***Environmental Auditing*** (Paris, FR.: UNEP, Industry and Environment Office) Report of a UNEP Program, Industry and Environment Workshop, Paris, 10-11 January 1989. Technical Report #2.

World Commission on Environment and Development (WCED), 1987. ***Our Common Future*** (New York, NY: Oxford University Press).

Interviews

Borghesani, R. 1996. Chairman Corporate Auditing Committee. Polaroid, Cambridge, MA.

DiBerto, M. 1996. Vice President, Arthur D. Little, Cambridge, MA.

Gerrard, M. 1996. Environmental Lawyer, NY, NY.

Marino, F. 1996. Executive Vice President, Raytheon, Lexington, MA.

Mulaney, A. 1996. Planner, Environmental Unit, Lancashire Planning Department, Preston, UK.

Nash, J. 1996. Research Associate, MIT, Cambridge, MA

Petracca, D. 1996. Partner-in-Charge. Price Waterhouse, LLP.

Prince-Roberts, J. 1996. Senior Scientist, Environmental Defense Fund, NY, NY.

Riedel, B. 1996. EPA Corporate Compliance Officer, Washington, DC.

Savitz, A. 1996. Corporate Environmental Accounting, Coopers-Lybrand, Boston, MA.

Woolard, T. 1996. Vice-President, ERM-London, UK.